MicroMarketplace
Begins on Page 54

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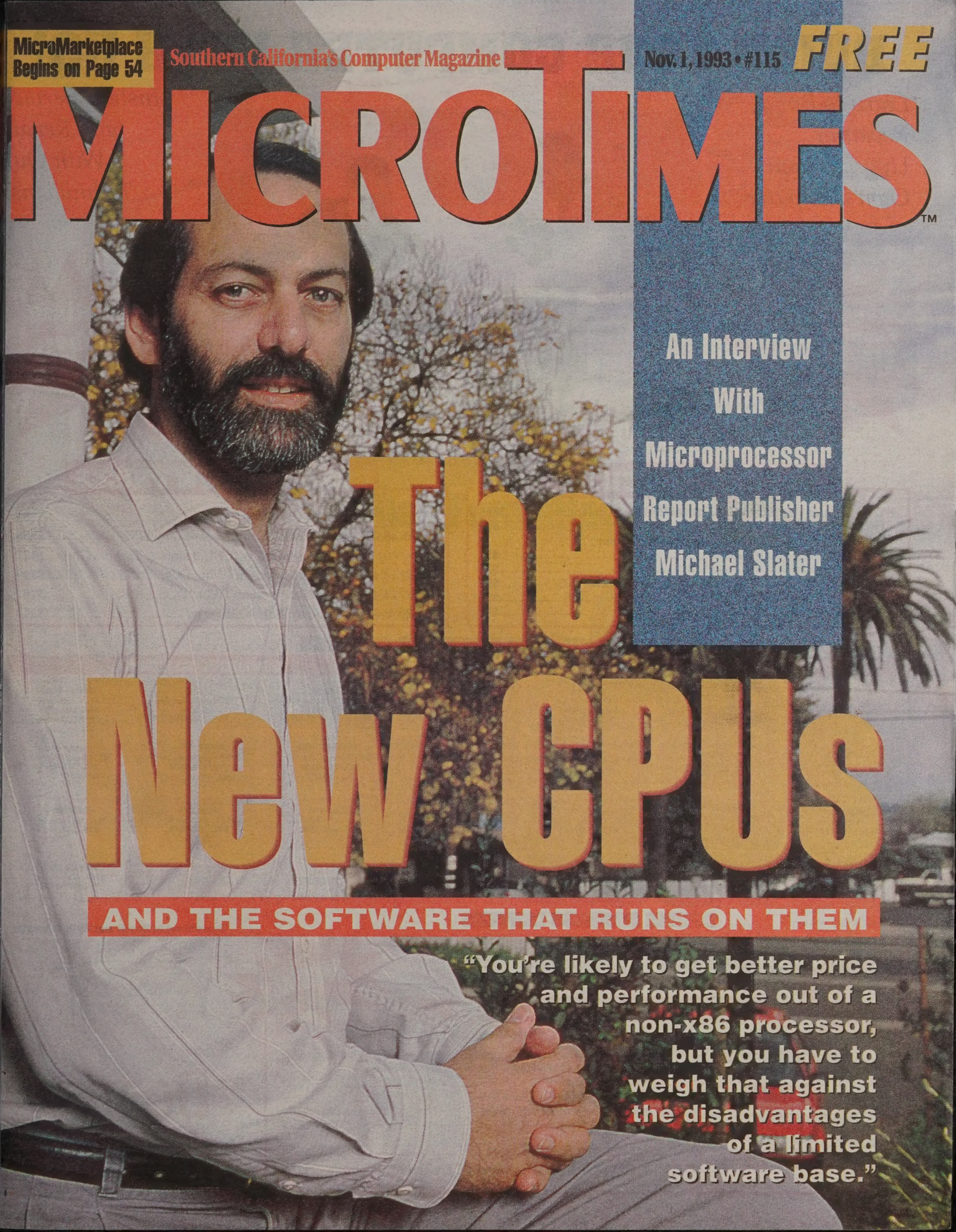

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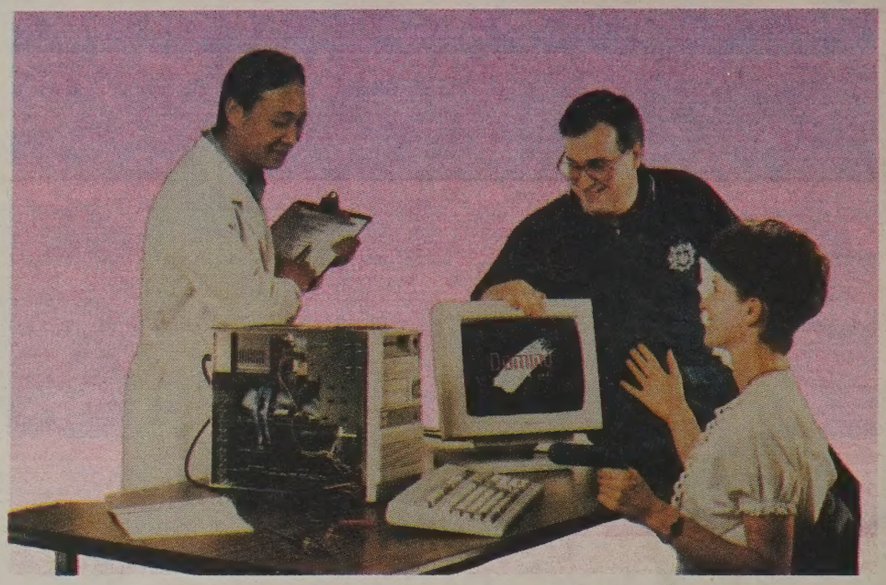

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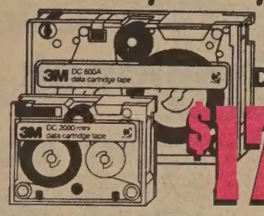

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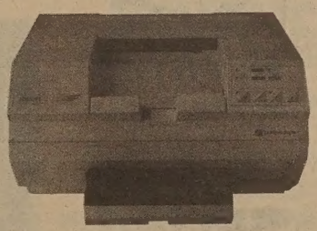

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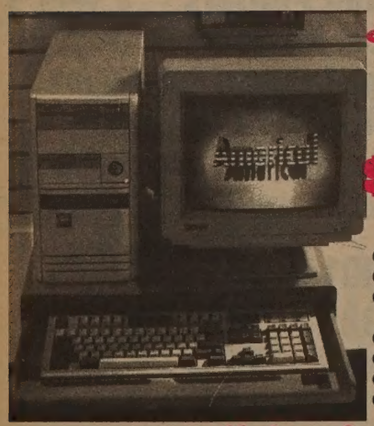

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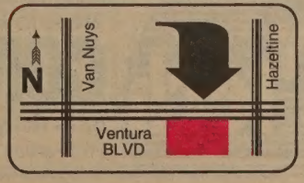

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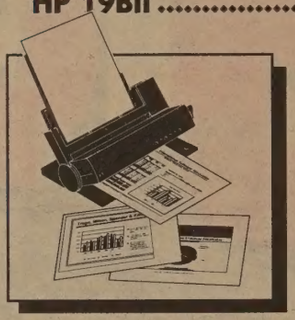

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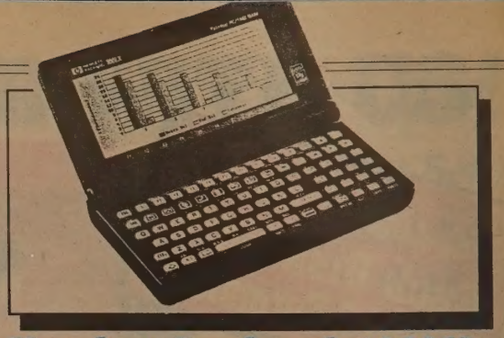

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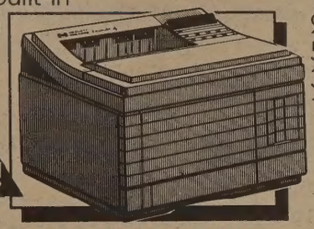

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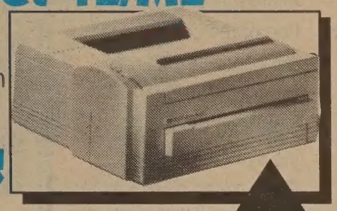

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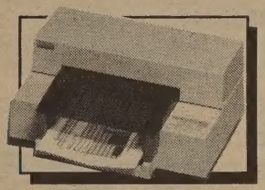

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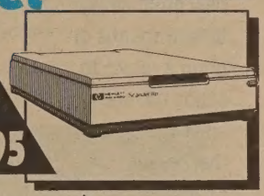

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A NOTE FROM THE EDITORS

Will the Intel-Microsoft domination of the desktop continue forever? Will the emerging operating systems and RISC-based chips bring amazing new productivity breakthroughs or bring a return to chaos not seen since the days of the Seequa Chameleon?

Michael Slater, editor-in-chief and publisher of *Microprocessor Report*, has been observing and analyzing the silicon-and-software scene for a demanding technical audience since 1987. In this month's cover story, we see what he thinks of the industry's current state and its implications for users and vendors alike.

—ME

COVER STORY

An Interview with *Microprocessor Report* Publisher Michael Slater

The New CPUs

And The Software That Runs On Them

By Mary Eisenhart 68

Cover Photo: Michael Jay

If you're trying to make sense of Pentium vs. PowerPC vs. Alpha vs. Sparc vs. MIPS, you're not alone. As the standards of the last ten years age, a host of contenders are challenging Microsoft and Intel, with varying degrees of success. If your work depends on understanding these trends, you'll probably find Michael Slater's insights very useful.

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Affordable high-quality color output is becoming a reality.

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A SPECIAL ADVERTISING SECTION FOR SOUTHERN CALIFORNIA'S COMPUTER BUYERS, STARTS ON **PAGE 54**

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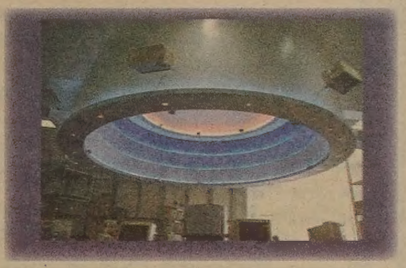

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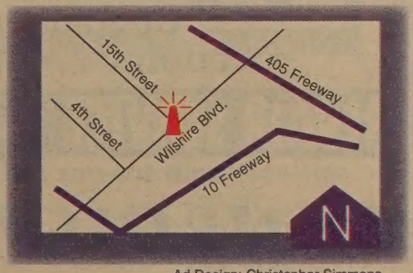

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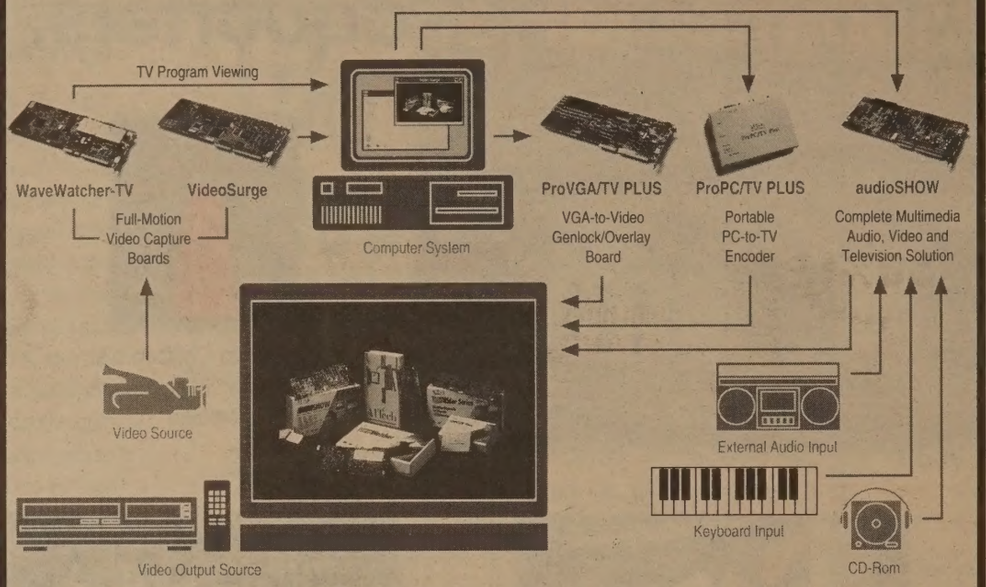

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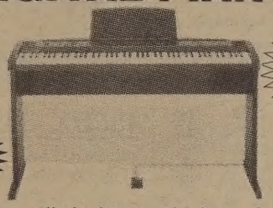

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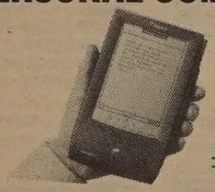

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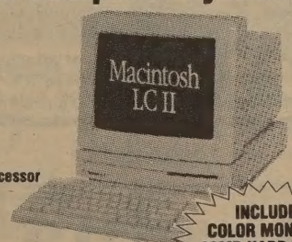

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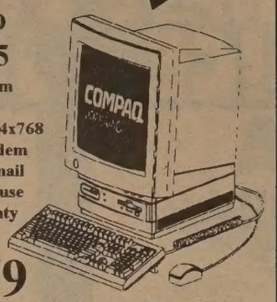

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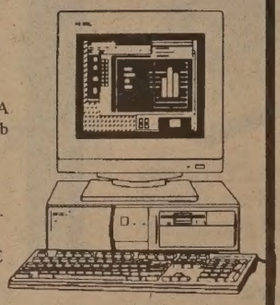

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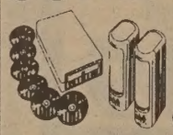
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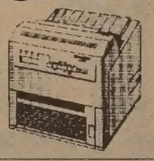
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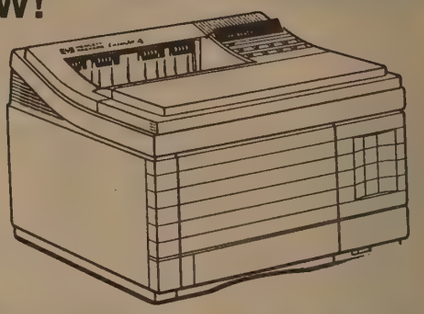

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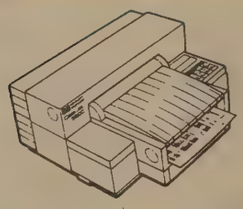

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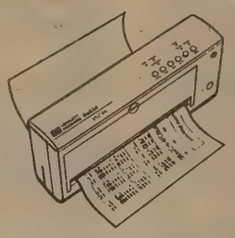

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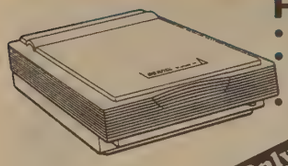

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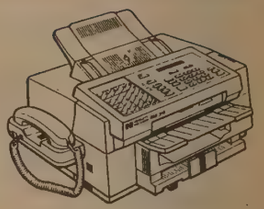

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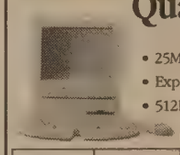

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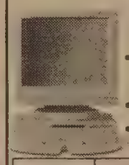

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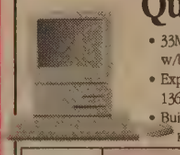

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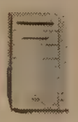

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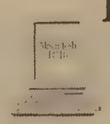

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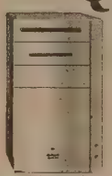

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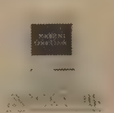

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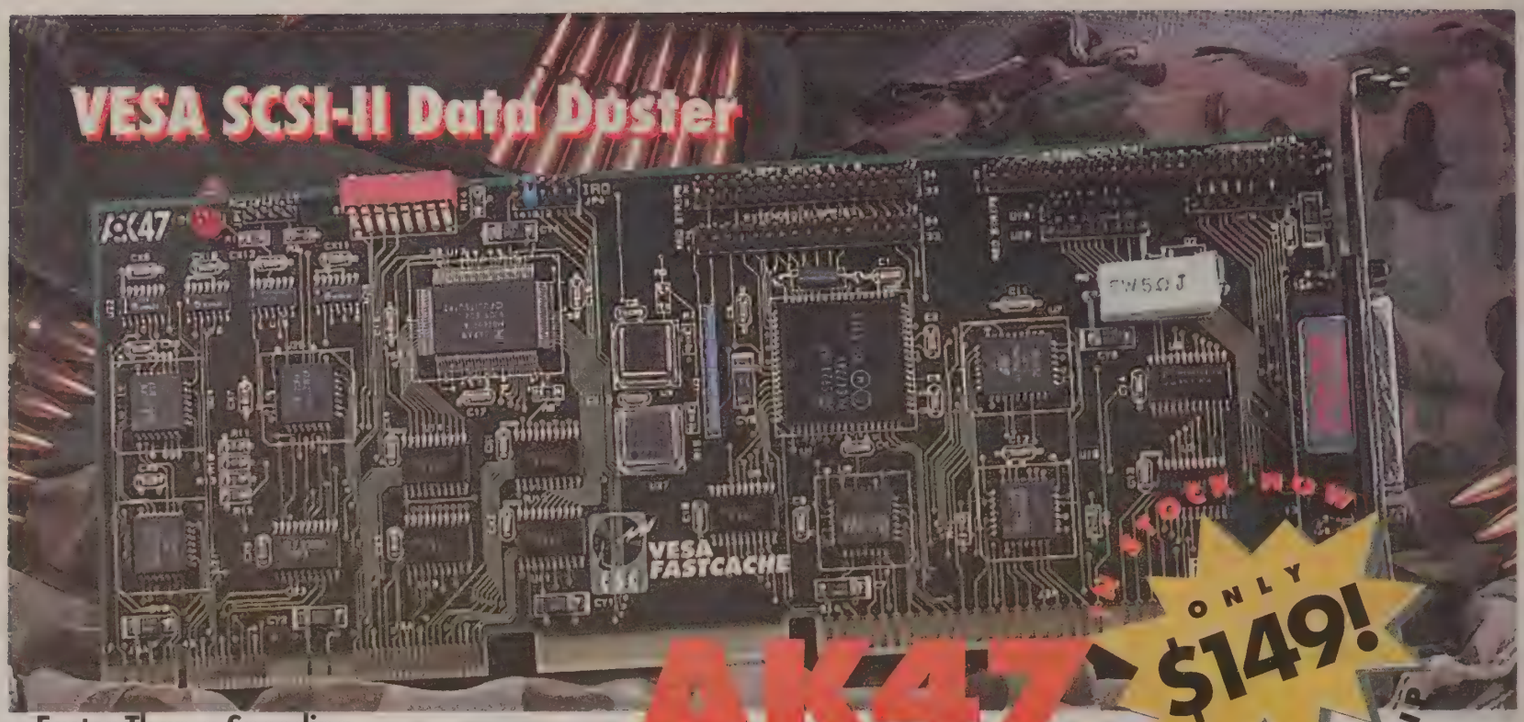

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INDUSTRY INSIGHT

Digital Highways, Novell DOS, Apple In The Software Business
Bell Atlantic And TCI To Merge

BY PAUL HOFFMAN

In a move that shows the growing importance of information delivery in the computer industry, media giant Tele-Communication Inc. (TCI) will merge with Bell Atlantic, the telephone provider for the mid-Atlantic states. The deal, one of the largest mergers in the history of the US, will create a giant company that can provide both information and access to that information to almost half of the country.

Both companies have been actively pursuing advanced technologies for bringing more than just television and telephone signals to homes and businesses, and the merger will most likely accelerate their entries into these markets.

The implications for computer users of this merger, and other similar mergers that are sure to follow in the coming years, are huge. Currently, most microcomputers are used to process information that was generated on the computer (such as data entered in a spreadsheet) or information that was generated within the company, usually retrieved over a network. CD-ROMs, touted as an easy method to make gigabytes of information accessible at very low cost, have not caught on nearly as well as was predicted five years ago. For people who have bought CD-ROM drives, the information content of the disks available has been limited, and even the best-selling titles have sold only one-tenth as well as regular software.

Copyright © 1993 by Paul Hoffman. All rights reserved. *Paul Hoffman is an industry analyst who has been covering microcomputer technology for ten years. He can be reached on Internet (phoffman @well) or CompuServe (71545,346). He also writes popular microcomputer books.*

The Bell Atlantic-TCI merger could significantly change the way people get their information.

The Bell Atlantic-TCI merger could significantly change the way people get their information. The two companies already own low-bandwidth pathways to homes and businesses all over the country. As the merged company switches these to fiber-optic cable in the next few years, it can offer its subscribers gigabytes of information a day at almost no cost to itself. This information could be on a demand basis—you request particular titles just as you request pay-per-view movies—or the company could broadcast free data based on a schedule, similar to the way cable-only channels operate. Bell Atlantic already has much of the needed broadcast technology, and TCI brings its years of marketing and billing experience.

For example, you could subscribe to a newspaper channel that would download the entire newspaper (or only the sections you want to pay for) each day, possibly updating it throughout the day. As an inducement to subscribe to its newspaper, one "channel" on the cable could be a free newspaper that just has the front page and a few local columns; the pay channel would be the full newspaper.

Another possibility would be an all clip-art channel: contributors or quality clip-art could get six months free. Due to Bell Atlantic's business in simple phone connections, access to the Internet and other for-fee services will likely be a big part of the grand scheme. Of course, there would also be an increase in pure entertainment television programming as well, with greater two-way interaction on choosing programs to be watched.

Many microcomputer manufacturers have come to understand the home computer market as really three overlapping markets: small business, entertainment, and education. Of these, small business and personal word processing have a much larger share than was expected. These users will probably be very interested in the ability to connect with others across the Internet. They will also be interested in services such as online reference material, discount business supplies, and so on.

The all-stock deal, in which Bell Atlantic buys all of TCI's stock, is estimated to be worth over $20 billion. The companies emphasized that the main advantage of the merger is that the resulting company could be more responsive to the individual subscriber, something that neither telephone companies nor cable companies are known for. Depending on how well the corporate cultures work together, the merger could set the tone for how people look at information and entertainment delivery in the latter half of the decade.

NOVELL TO CHALLENGE MICROSOFT AGAIN WITH NOVELL DOS 7

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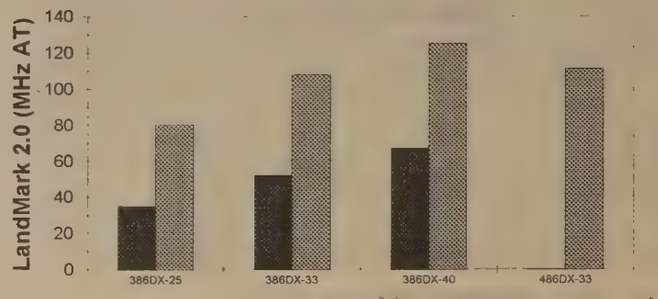

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integrated Novell DOS v7 within a month. The software, a replacement for Microsoft's MS-DOS v6, is not expected to take the computer market by storm, but will enhance Novell's position in the networking world by providing a more flexible operating system with low-end networking built in. For companies that are already committed to Novell's NetWare, it will be an attractive alternative to MS-DOS for many users.

The operating system has some major features lacking in the current versions of MS-DOS, such as pre-emptive multitasking of programs and automatic sharing of network resources. Pre-emptive multitasking allows you to run more than one program at a time and change the priority of the tasks that are running in the background. For example, if you are using a database management system and a communications program at the same time, neither stops when it is put in the background, allowing long tasks to take place without hogging the whole system. This is currently available to MS-DOS users who buy an additional program like Quarterdeck's DESQview. The automatic sharing of resources lets all users access disks and printers within a workgroup with almost no effort.

One of the features sure to endear Novell DOS to corporate managers is that it allows old low-end systems, even those based on the 8088, to share resources.

One of the features sure to endear Novell DOS to corporate managers is that it allows old low-end systems, even those based on the 8088, to share resources. Many corporations with budget problems would like to avoid buying new computers just to keep them on the company network, and Novell DOS will make that possible. While Microsoft's Windows has virtually abandoned all computers with a CPU less powerful than a 386SX in them, Novell hopes to rope in new customers by supporting older PCs.

APPLE JUMPS INTO MAC/PC SOFTWARE RETAIL MARKET

Following the lead of Dell and Gateway 2000, Apple will begin to sell software manufactured by others as a part of its daily business. Instead of relying on print ads and catalogs, however, Apple will ship the software on free CD-ROMs. To purchase the software, you call a toll-free telephone number and give them a credit card number; the operator then gives you a software access key that unlocks the software and lets you copy it to your hard disk.

Apple has long been one of the strongest proponents of CD-ROM technology, and a relatively high percentage of Macintosh users have a CD-ROM player. By providing the CD-ROM for free, Apple gains a great deal of marketing clout over standard software retailers who rely on print advertising and direct mail.

Apple is also providing a great deal of pre-sale information on the CD-ROM including demonstration versions, interactive tours, and product sheets. Most retail stores only provide data sheets for software and usually cannot demonstrate the software; mail order companies usually will not even provide data sheets.

The main disadvantage of Apple's program, called Software Dispatch, is that you do not get printed documentation with the software. On the other hand, you do get electronic versions of the documentation with hypertext links, and you can print the

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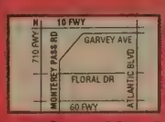

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documentation if you wish. The documentation uses Apple's DocViewer software, which has been praised by Apple developers as Apple has switched much of its technical documentation to DocViewer format. Users who have begged for online versions of an entire manual instead of just the quick reference that most programs provide may flock to Software Dispatch just for the documentation. Of course, these users had better have a lot of hard disk space to spare for the manuals. Apple says that some of the manuals will be able to be purchased separately as well.

Apple is not the first to announce CD-ROM delivery of software, but it will probably be among the first to ship. The first disk will be for Macintosh users; Apple says that it will release a CD-ROM of Windows software early next year. The Macintosh disk will contain over fifty applications and clip-art packages from major software companies such as Claris, Symantec, and Intuit. To order the free CD-ROM, call Apple at 1-800-937-2828, extension 600.

NOVELL TRANSFERS UNIX TRADEMARK TO X/OPEN

Hoping to reduce the factionalism in the UNIX marketplace, Novell transferred the UNIX trademark to a standards group that will enforce brand-name specifications. The move should make it easier for users to know what is and is not standard UNIX in the future. X/Open is an independent open systems organization based in London that has garnered a great deal of support around the world for its testing and specification suites.

Novell purchased AT&T's UNIX System Laboratories (USL) earlier this year in hopes of expanding its already-large share of the networking market. That move scared many UNIX vendors with whom Novell hoped to work, but transferring the UNIX specification to an independent group should allay most of those fears. X/Open has a stronger following outside the US, but many American manufacturers have followed its guidelines for making their software interoperable.

By controlling the trademark, X/Open will be able to say who is and is not running true UNIX. They have committed to produce a full set of tests for conformance to the UNIX base. It is not clear what X/Open will do to companies who do not conform to the tests, particularly companies that are not official members of X/Open. However, since most UNIX hardware manufacturers want to at least appear to be following standards, it is likely that most will conform as fully as possible.

Novell's move gives the company new credibility in the UNIX marketplace. While many manufacturers fight for slices of the hardware market, Novell wants to be sure that as many systems as possible support Novell's networking. Although they will continue to sell their own version of UNIX, it is even more important to them that they stay on top of the networking market regardless of whether the file server is running NetWare or UNIX. ■

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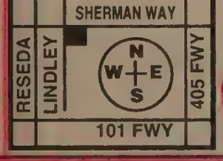

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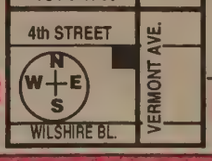

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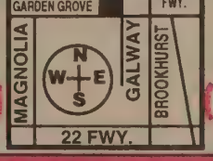

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MICROTIMES STOCK INDEX POSTS IMPRESSIVE GAINS

Throughout the month-long trading session, computing stocks performed well despite the sell-off of economically sensitive concerns. Most computing stocks posted earnings for the third quarter above analysts' estimates, which in turn, helped the MicroTimes Stock Index rise 260.47 points, or 6.18%, before closing at 4473.13.

The Dow Jones Industrial Average also traveled in a northerly direction during the period, increasing 29.06 points, or .8%, en route to a closing mark at 3642.31. The NASDAQ Composite performed second only to the MicroTimes Stock Index upticking 42.80 points, or 5.78%, before closing at 782.91.

TURNING TO COMPUTING CONCERNS:

Motorola Inc. garnered the largest dollar gainer honor for the period, as that concern added $14.13, or 15.4%, onto its price before reaching a closing price of $105.88. In a recent news release, Motorola announced earnings for the third quarter ended October 2, 1993, and they read as follows: net income increased 100% to $254 million from $127 million recorded one year ago. Shares of Motorola traded 5% higher on October 11 because of the higher-than-expected earnings.

Apple Computer Inc. was another gainer in the accompanying chart, increasing $3.13, or 12.38%. Apple closed at $28.38. Apple disclosed that fourth-quarter earnings decreased to $2.7 million, or 2 cents a share, from $97.6 million or 81 cents a share, recorded in the same quarter one year ago. Revenue jumped to $2.14 billion, a new record, from $1.76 billion one year ago. Despite the decrease in earnings, Apple's fourth-quarter results were better than the 3-cent loss expected by analysts.

LSI Logic Corp., a Fortune 500 supplier of high-performance semiconductors, announced third-quarter revenues were 19% higher at $184 million from $154 million recorded one year ago. LSI achieved a new record net income figure of $14.4 million up from a year ago loss of $111 million. According to Chairman and Chief Executive Officer Wilfred J. Corrigan, "The financial turnaround has been achieved by increased revenues, higher factory utilization, and lower operating expenses." Despite the increased income, LSI Corp. fell $2.63, or 14.89%, before finally coming to a closing price of $15.00.

Advanced Micro Devices Inc. was the largest percentage and dollar loser of the lot last month, as the concern plummeted $9.25, or 31.94%, before bottoming out at $20.13. Advanced Micro Devices recently reported third-quarter earnings of $61.3 million versus $64.4 million recorded one year ago, a decline of 4.7%. Separately, Advanced Micro Devices' rating was cut at Merrill Lynch to intermediate "neutral" from "above average." ■

EXCH	COMPANY		TICKER SYMBOL	CLOSING PRICE 09/17/93	CLOSING PRICE 10/18/93	NET CHANGE IN MONTH	PERCENT CHANGE IN MONTH	P/E RATIO	ANNUAL DIVIDEND RATE	ANNUAL DIVIDEND YIELD	ANNUAL HIGH	ANNUAL LOW
	SOFTWARE											
OTC	Adobe		ADBE	16.50	22.88	6.38	38.64	21	0.20	0.87	37.00	14.00
OTC	Aldus	(H)	ALDC	19.25	23.88	4.63	24.03	92	0.00	0.00	23.88	11.75
OTC	Autodesk		ACAD	48.13	47.50	-0.63	-1.30	21	0.48	1.01	56.75	38.75
OTC	Borland	(L)	BORL	14.00	15.50	1.50	10.71	–	0.00	0.00	35.00	12.75
OTC	Informix		IFMX	18.50	21.25	2.75	14.86	28	0.00	0.00	27.25	12.00
OTC	Lotus	(H)	LOTS	38.25	47.00	8.75	22.88	50	0.00	0.00	50.75	17.50
OTC	Microsoft		MSFT	76.00	83.00	7.00	9.21	26	0.00	0.00	98.00	70.38
OTC	Novell	(L)	NOVL	19.00	19.13	0.13	0.66	–	0.00	0.00	35.25	17.00
OTC	Oracle	(H)	ORCL	52.63	64.25	11.63	22.09	56	0.00	0.00	64.50	18.88
OTC	Software Publishing		SPCO	6.75	7.13	0.38	5.56	–	0.00	0.00	14.50	5.50
OTC	Symantec	(H)	SYMC	18.25	20.00	1.75	9.59	–	0.00	0.00	20.50	8.75
	HARDWARE											
OTC	Apple	(L)	AAPL	25.25	28.38	3.13	12.38	20	0.48	1.69	65.25	22.00
OTC	AST Research		ASTA	15.25	17.25	2.00	13.11	–	0.00	0.00	24.25	12.75
NYS	Commodore		CBU	3.25	3.25	0.00	0.00	–	0.00	0.00	9.25	2.50
NYS	Compaq	(H)	CPQ	57.63	63.38	5.75	9.98	15	0.00	0.00	63.38	38.13
NYS	Digital Equipment		DEC	38.63	36.50	-2.13	-5.50	–	0.00	0.00	49.25	30.38
OTC	Dell		DELL	17.00	18.88	1.88	11.03	–	0.00	0.00	49.88	13.50
NYS	Hewlett-Packard		HWP	67.88	73.00	5.13	7.55	19	1.00	1.37	89.25	53.75
NYS	IBM		IBM	43.38	44.00	0.63	1.44	–	1.00	2.27	70.25	40.63
NYS	Silicon Graphics	(H)	SGI	38.50	45.13	6.63	17.21	37	0.00	0.00	45.50	20.38
OTC	Sun Microsystems	(L)	SUNW	26.00	24 13	-1.88	-7.21	15	0.00	0.00	41.00	21.13
NYS	Xerox	(L)	XRX	71.75	73.63	1.88	2.61	–	3.00	4.07	88.88	69 88
NYS	Tandy	(H)	TAN	35.88	37 75	1.88	5.23	21	0.60	1.59	39.38	24.63
	CPU'S											
NYS	Advanced Micro Devices		AMD	29.38	20.13	-9.25	-31.49	8	0.00	0.00	32.88	12.88
OTC	Intel	(H)	INTC	64.25	63.00	-1.25	-1.95	15	0.20	0.32	74.50	31.13
NYS	LSI Logic		LSI	17.63	15.00	-2.63	-14.89	–	0.00	0.00	19.25	6.25
NYS	Motorola	(H)	MOT	91.75	105.88	14.13	15.40	34	0.44	0.42	105.88	47.06
	COMMUNICATIONS											
NYS	AT&T		T	59.25	59.13	-0.13	-0.21	20	1.32	2.23	65.00	41.00
NYS	BellSouth Corp.		BLS	61.75	61.88	0.13	0.20	19	2.76	4.46	62.88	46.75
OTC	MCI		MCIC	28.50	28.00	-0.50	-1.75	23	0.04	0.14	29.88	16.81
NYS	Northern Telecom		NT	25.63	27.63	2.00	7.80	–	0.36	1.30	46.00	21.38
NYS	Pacific Telesis		PAC	54.63	54.63	0.00	0.00	26	2.16	3.95	56.50	39.50

KEY: NYS = NEW YORK ASE = AMERICAN OTC = OVER THE COUNTER
(H) = NEW HIGH REACHED IN PERIOD (L) = NEW LOW REACHED IN PERIOD

MARKET DIARY:

ADVANCES	22
DECLINES	8
UNCHANGED	2
NEW HIGHS	9
NEW LOWS	5

MOST ACTIVE ISSUES:

LARGEST DOLLAR GAINER	Motorola	$ 14.13
LARGEST DOLLAR LOSER	Advanced Micro Devices	$ -9.25
LARGEST PERCENTAGE GAINER	Adobe	38.64 %
LARGEST PERCENTAGE LOSER	Advanced Micro Devices	-31.49 %

	CLOSE 09/17/93	CLOSE 10/18/93	NET CHANGE IN MONTH	PERCENT CHANGE IN MONTH
MICROTIMES STOCK INDEX	4212.67	4473.13	260.47	6.18
DOW JONES INDUSTRIAL AVERAGE	3613.25	3642.31	29.06	0.80
STANDARD & POOR'S 500 STOCK INDE	458.83	468.42	9.59	2.09
N.Y.S.E. COMPOSITE	254.66	260 00	5.34	2.10
NASDAQ COMPOSITE	740.11	782.91	42.80	5.78

CLOSING QUOTES FOR GRAPH:		
DATE	MICRO TIMES	DOW JONES
04/01/93	4196.89	3439.44
04/29/93	4074.63	3425.12
05/27/93	4554.50	3554.83
06/24/93	4266.52	3490.61
07/22/93	4072.42	3525.22
08/23/93	4264.70	3605.98
09/17/93	4212.67	3613.25
10/18/93	4473.13	3642.31

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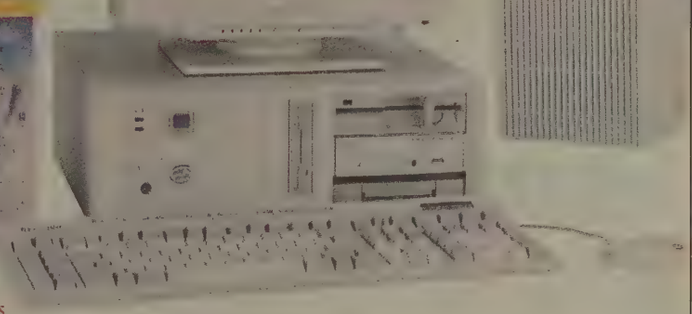

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PC Magazine
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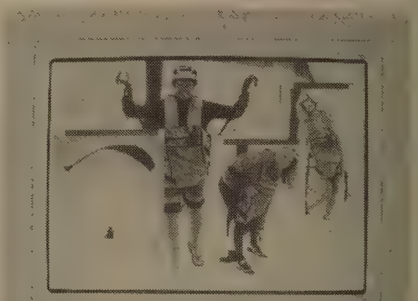

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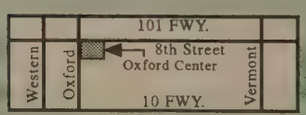

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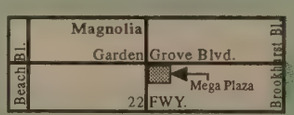

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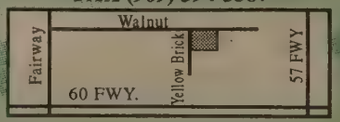

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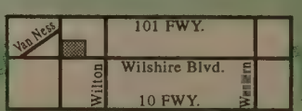

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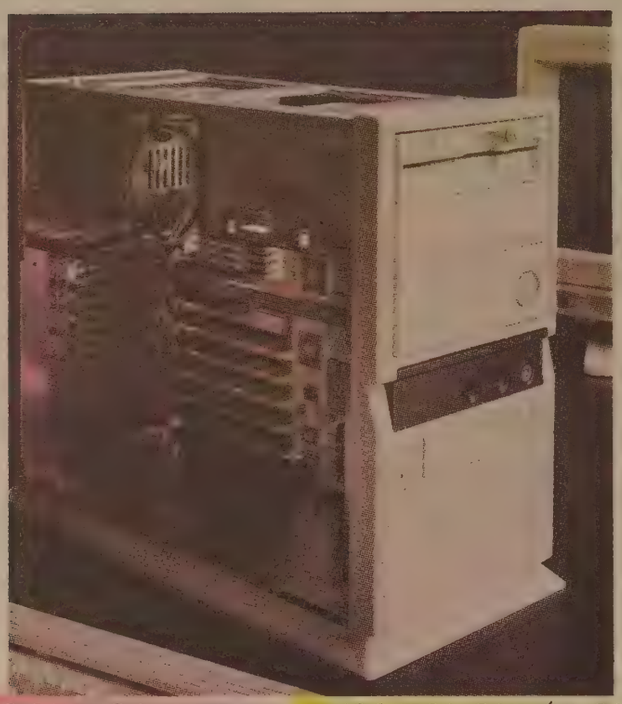

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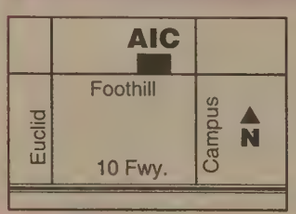

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Free Online Access
To California Legislation And Laws,
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BY JIM WARREN

These columns concern the future. This one concerns the future of computer-assisted public access to the process of our governance—which will begin within two months. Without charge by the state. Now guaranteed by law!

AB1624 SIGNED

The night of October 11th, the last day he could act, Governor Pete Wilson signed Assembly Bill 1624 into law. Like most of the eleven hundred-plus bills passed by the Legislature in 1993 that the Governor signed, it will take effect January 1, 1994.

FIRST IN THE NATION

This appears* to be the first time that, mandated by law, *comprehensive* information about state laws and legislation in process have been made available by a state via the nonproprietary public computer networks—especially without charging fees.

**Note: Hawaii has offered such information via an expensive, tax-underwritten, isolated state network, and I just heard they're now accessible by telnet (permission requirements, if any, unknown). I also just heard that Washington State began this year making bill-text available over the Internet, but don't yet know what other (essential) information is included, nor whether it's mandated by law or merely by momentary policy whim, easily constricted or withdrawn.*

REALIZABLE FANTASIES

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TIMELY ACCESS

AB1624 will permit access to legislative details in time to participate in the process of our governance—not just gripe about the results, after the fact. Until now, such statewide participation was simply not practical using snailmailed copies of quickly obsolete printed legislative information.

USEFUL FORM

Legislative data arriving in computerized form can be:

- Automatically monitored for *all* "interesting" words and phrases;
- Quickly searched for *all* specified topics and subjects;
- Indexed, hyperlinked, and cross-referenced to other related information;
- Linked to personal or proprietary data; filed however personally desired;
- Excerpted, processed, and forwarded to others, quickly and accurately.

And—oh yes—folks can also read it.

GLOBAL ACCESS

Using the public global networks provides Californians temporarily out of state—and anyone else interested—with equal access to up-to-the-moment legislative and statutory records. It also gives other states' legislators, legislative staff, and federal legislators fast, easy access to current California legislation and statutes—often used as models by other states and Congress.

MODEL FOR OTHER STATES

AB1624 can be used as a model by citizen-activists and legislators of other states willing to encourage open democratic processes. (I expect to publish some suggested improvements, as well as nuts-'n'-bolts details about how any generic legislative/political process works and how anyone can use the nets to effectively advocate public-interest law, including legislation like AB1624.)

FIRST(?) EXAMPLE OF "NET POWER"

Finally, this appears (please let me know if you know of other instances) to be the first time online advocacy and network-assisted citizen action was *instrumental* in structuring and obtaining the passage of legislation. (However, there have been several instances where net action *halted* undesired legislation or regulations—e.g. FBI-desired prohibitions on secure cryptography, proposals for modem taxes, etc.)

I first heard of bill-author Debra Bowen's original skeleton bill—which had no implementation language—shortly after she introduced it. When I contacted her office, they thanked me for my interest but said the bill was effectively dead because (1) Legislative Data Center staff had said it would cost millions to implement, and (2) they hadn't found any public support for it.

I assured them there was an almost-free way of implementing it using the Internet (what's that?), and went online that night, broadcasting details and a call for citizen action and support.

Both Bowen and Winkley have said that this net-based information, advocacy, and time-sensitive action-alerts were instrumental in the bill's resurrection, progress, and passage.

I detailed an implementation in a 16-page report to legislators, shortly after the bill's first committee hearing. (Paper-only copy available: Send 9"x12" SASE with postage for 5 oz.—$1.21, this week.)

And it was the option of using a low-cost file-server (I offered a donor machine if they couldn't afford one) and the almost-free public networks that made the costs near-

continued on page 96

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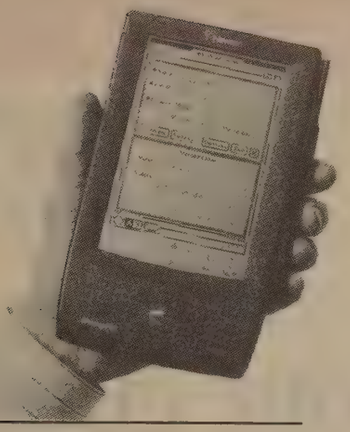

Hands On: The Apple Newton

The Truth Lies Between The Extremes

BY MITSU HADEISHI

Now widely available, the basic Apple Newton MessagePad PDA (Personal Digital Assistant) is selling for about $799, or, bundled with a Macintosh Connection Kit and 9600bps fax/2400bps data modem, for around $1000. (The Sharp ExpertPad, essentially the same machine as the basic MessagePad, is going for about $699.) Measuring 4 1/4" x 7 1/4" x 7/8", the unit is even larger than a Sharp Wizard OZ-8000 or a Casio SF-R20, which makes it too large to fit into a pants pocket, but neverthless small enough for a jacket pocket.

Many have criticized the MessagePad as too expensive, not good enough at handwriting recognition, not equipped with enough memory, and not shipped with enough built-in applications. Others have hailed it as a technological breakthrough, tremendous power in a small and remarkably inexpensive package, and the first real consumer-level product in a new, soon-to-be multi-billion-dollar industry. Where does the truth reside?

As usual, somewhere in the middle.

PENS AND PALMTOPS

NEWTON HANDWRITING

As I mentioned in last month's column, the Newton handwriting recognition engine works in a special way: it recognizes entire words, rather than single letters. This makes for much better recognition capability than what's in the pen-based operating systems such as GO Corporation's PenPoint or Microsoft's Windows for Pens.

However, when I first turned on the unit, it could accurately recognize less than half of the words I wrote. Many times its attempts at interpretation were rather perplexing ("The electricity is buzzing in my ear" became "The electricity is berries I'd 44 LA." Note that it got the word "electricity"—it tends to do better with longer words, as I'll explain below). As I worked with the machine, however, it slowly improved in its recognition rate; after several hours, it was recognizing at around 90% or so. I've heard reports of experienced users getting recognition rates of at least 95%. That is relatively good, since you can quickly correct errors by double-tapping on the word misrecognized, and it often lists the word you're looking for as an alternate choice. This became less of an issue as time went on: I slowly became more proficient at learning how to write so the machine would interpret it more accurately, and the machine became better at understanding my own handwriting.

Interestingly, the Newton is better at recognizing cursive handwriting than printed characters—exactly the opposite of other handwriting recognizers, which usually do not work at all with cursive writing. It also tends to work better if you write each word continuously, without stopping; some people, when first using the Newton, attempt to write very slowly, one letter at a time, and then complain that the unit does not recognize their handwriting. If you pause long enough, the Newton assumes you're starting a new word. On the other hand, if you don't space your words out enough, the recognizer can run two words together and try to interpret them as one word ("Eat lunch" was interpreted as "entrance," for example, when I wrote the words too close together).

The upshot is that the Newton is generally better at recognizing handwriting the other units have difficulty with (or cannot handle at all), but it does require some care to get reasonable recognition rates.

It is also interesting that it does much better on longer, more complex words than on shorter, common words. The longer words are generally more unambiguous; fewer other words could be potential matches. Shorter, more common words are more difficult for it to interpret, because there are many words the Newton could mistake for the word you're intending to write. Again, this is different from most letter-based recognizers, which are more likely to misread a long word than a short one, just because there are more letters, and therefore more chances that one of them will be misinterpreted.

Of course, if the word you are trying to use doesn't happen to be in the Newton's vocabulary, it won't have a clue. (Curiously, even though the unit is supposed to be primarily an address book/day-timer replacement, it does not recognize ordinal numbers, as in "23rd of December" or "15th of this month.") However, you can add words to the Newton's vocabulary, either by correcting it when it misinterprets your writing, or by typing the unknown words directly into the user dictionary. I added the ordinal numbers from 1st–31st, after which it had no problem recognizing them quite easily.

PENS: NOT A PANACEA

Even if the unit had 100% recognition accuracy, however, it would not be nearly as fast as a keyboard for entering data. The designers of the Newton have explicitly said that they envision the unit as being primarily used for data retrieval rather than data entry. For example, they imagine you'll be spending a lot more time using it to look up names in an address book than entering memos or writing letters and notes.

Personally, I use my Casio SF-R20 for both purposes; as an address book (primarily data retrieval) and as a memo pad/sophisticated calculator (primarily data entry). The built-in spreadsheet is a lot more powerful than any calculator, and it is portable—fits right in my pocket—so I can use it to do simple financial analyses or other computations anywhere, anytime. Or I can quickly jot down people's addresses

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43 ( ) ULTRIX
44 ( ) MS-DOS
45 ( ) OS/2
46 ( ) HP-UX
47 ( ) SUN/OS/SOLARIS
48 ( ) Windows NT
49 ( ) UNIX/XENIX
50 ( ) SCO
51 ( ) A/UX
52 ( ) Other
53 ( ) VM
54 ( ) OS/400
55 ( ) MVS

4. Total employees in entire company/institution/government department (select only one):
2 ( ) 10,000 or more
3 ( ) 5,000 to 9,999
4 ( ) 1,000 to 4,999
5 ( ) 500 to 999
6 ( ) 250 to 499
7 ( ) 100 to 249
8 ( ) 6 to 99
9 ( ) Fewer than 6

5. Amount of all computer-related expenditures to be made by my organization annually (or by my client's organization if I am a reseller or consultant):
70 ( ) Over $5,000,000
71 ( ) $1,000,001-$5,000,000
72 ( ) $500,001-$1,000,000
73 ( ) $100,001-$500,000
74 ( ) $50,001-$100,000
75 ( ) $25,001-$50,000
76 ( ) Up to $25,000
77 ( ) None of the above

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RESOURCES:

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Casio Executive B.O.S.S. SF-R20
Casio, Inc.
(800) 762-1241.

Sharp Wizard and Sharp ExpertPad
Sharp Corporation
(800) 321-8877.

and phone numbers as they give them to me. This is not as easy to do, strangely enough, with the Newton.

We did an unscientific test with a few different people entering data into both the Newton and the Casio SF-R20 at the same time. First, I tried entering a simple sixteen-word sentence into both the Newton and the SF-R20. After having a few hours' training, Newton was able to recognize most of the words, but the time it took to correct the errors and edit it brought the total time to enter the sentence to around seventy seconds.

By contrast, typing into my Casio (something I am very adept at from long practice, admittedly), it took thirteen seconds, even on the tiny little organizer keyboard (it took me seven seconds to enter it on a full-sized computer keyboard). This test, of course, is extreme, since I am very accustomed to using the Casio keyboard. So we repeated these tests with people who are proficient full-sized keyboard typists but have not used a small organizer keyboard more than a few times before. They took about 25-30 seconds to type the same sentence into the Casio. We also tried to see how fast we could simply hand-write the same sentence, ignoring errors—it took around twenty-five seconds, and of course the recognition was terrible.

The conclusion we reached is this: even a 100%-accurate handwriting recognizer would be no faster than a good typist entering information, even on a tiny organizer keyboard—and, with a little practice, typing could be twice as fast as the handwriting method of entry. However, factoring in correction of errors, and the handwriting recognizer drops to two to five times slower than typing, even on a tiny organizer keyboard (for a proficient typist).

The only users for whom handwriting might be a faster way to enter data would be those people who do not know how to use a keyboard well. Thus, the Newton could be said to really be the "computer for the rest of us"—where "us" refers to those folks who have not yet even learned to type, but would rather use handwriting as their preferred input medium.

Of course, pen input provides other benefits that you do not get from a keyboard. In particular, the display can be larger, since the input device *is* the display. One can easily enter drawings and other graphical information. Handwriting is natural—you just pick it up and start jotting down notes. We're used to doing that already. I would, however, personally prefer a combination of both.

The Newton is therefore usable for a certain restricted class of applications. You do not want to use it to enter large or even medium amounts of textual information. Very brief notations, and so forth, are really its limit. You don't want to write letters with it, or try to do extensive computations—the numeric recognizer often misreads numbers, and it isn't always easy to notice that it is doing so. However, if your use is primarily as an information retrieval device, where you're reading email (but not responding at length), reading memos, looking up addresses, or perhaps using the machine with an plug-in PCMCIA 2.0 card for the purpose of accessing a database or library, then the Newton could well have a niche of usability.

Newtonian Applications

Built-in applications for the Newton are extremely basic. You have a notepad, an address book, a calendar, and a calculator capable of doing simple financial computations and units conversion. In addition to these applications, the Newton has built-in support for fax modems, data modems, and a built-in infrared communications port which it can use to transfer information to other Newtons. The notepad can be used for both text and graphics.

Off the shelf, the Newton doesn't offer significantly more functionality than some of the low-end organizers that have been on the market for some time. In addition, data entry is even slower than these organizers, as noted above. The rather small suite of built-in applications limits its real utility out of the box. The card slot allows you to add functionality, although there is only one slot, so you couldn't, for example, add both memory expansion and an application card at the same time.

How well does it do as an organizer? Well, after training it, I definitely found it usable, though I wouldn't trade in my SF-R20 for it at the moment (even if the Newton didn't cost two to three times what a high-end Wizard or Casio does, or four to ten times more than a more inexpensive

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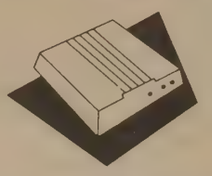

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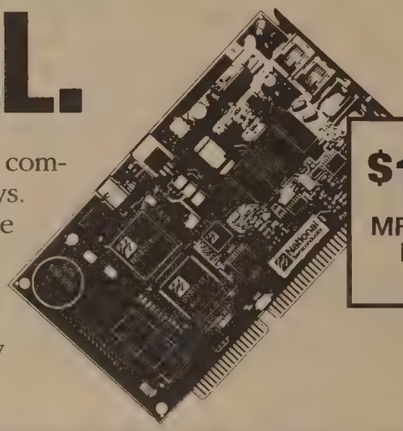

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organizer). The calendar is functional, though basic; for example, unlike the Sharp Wizard or Casio B.O.S.S. organizers, it doesn't display which days you have an appointment or an alarm. You can easily search for appointments by name, and it does have a handy find facility, though it isn't very much more powerful than similar facilities in high-end Sharp or Casio organizers.

The address-book situation is similar. Entering names and addresses can be a particularly laborious task, for reasons stated above; in addition, most proper names are not in the dictionary, so you have to enter them letter by letter in many cases (usually by tapping the names out on a little pop-up display of a keyboard). Though finding addresses and names is quite straightforward and relatively quick, again the functionality is not much better than a pocket organizer which can be had for much less money.

The unit is most usable as an address book and calendar. The memo pad function is not very good for large or medium amounts of text because of the slowness of data entry (made worse by having to correct the occasional errors). One feels a sense of accomplishment just entering one correct sentence!

Graphics are easy to put into this machine, however, so for jotting down quick maps, diagrams, and so forth the Newton is quite capable. The user interface is uniform and intuitive, which does make it a lot better for novices than another pen-based organizer, the Sharp OZ-9600, which has a very complicated and awkward UI.

So, if you need graphics input, are not intending to input a lot of text into the machine, and are planning to use it primarily as an information-access device, then the Newton could be useful for you. It might also serve you well if you simply don't want to use a small organizer keyboard and need a well-designed, uniform, and generally powerful user interface.

Sharp ExpertPad

The Sharp ExpertPad is identical to the basic Newton, but it comes with a cover which protects the display, and it is also selling for a slightly lower price.

However, the Macintosh Connection Kit, used to connect the Newton to an Apple Macintosh computer and to transfer information back and forth, is available only from Apple (it is also available from Apple as a special bundle with the Newton called the MessagePad Professional Communications System, including the Macintosh Connection Kit and a 9624 fax modem). ■

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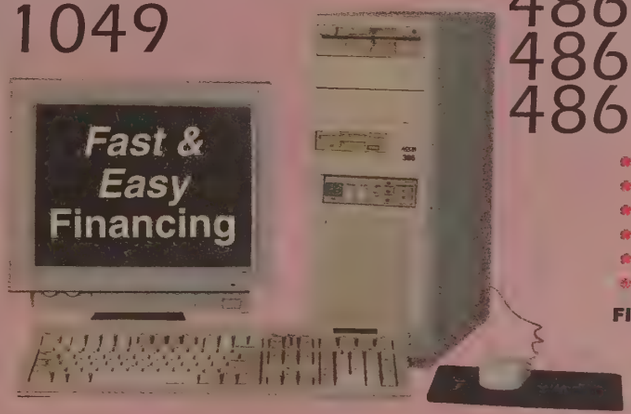

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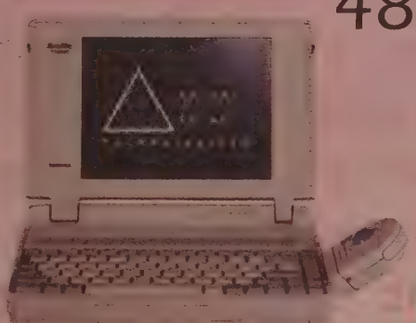

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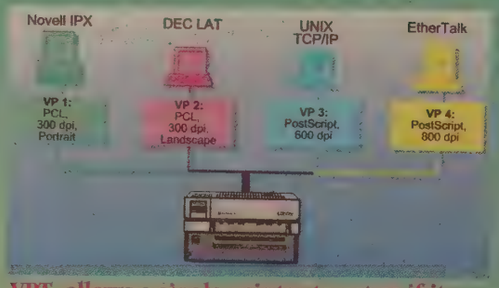
By Matthew Rothenberg



VPT allows a single printer to act as if it were up to 64 individually-configured printers on a network.

Woodland Hills, Calif.- New networking technology from Dataproducts Corp. promises to extend the horizons of the company's own printers as well as future LaserWriter models from Apple.

The new software, which Dataproducts has dubbed Virtual Printer Technology (VPT), turns the printer into a network server that can be set up with as many as 64 "virtual printers," accessible by all CPU's on a mixed network.

Initially, VPT will be available this month with two new printers, the LZR 1580 and LZR 2080. With VPT, each virtual printer can be configured with setting for resolution, language emulation, networking protocol, and default paper tray. Users can select from among multiple Mac-compatible virtual printers via the chooser, thus changing the configuration of the printer for a particular job without inconveniencing other users.

Dataproducts said future models will let users choose resource accounting and context management options for virtual printers, although initial releases will not support this feature.

Dataproducts said it will use VPT in its own printers and license the technology to other venders, which sources said include Apple.

VPT will be offered as an option with Dataproducts' LZR 1580 and included with the LZR 2080 printers. Dataproducts' new 15- and 20- page-per-minute laser printers can output 8.5-by-11-inch or 11-by17-inch pages at a maximum resolution of 800 by 800 dpi. Both models come with Adobe PostScript Level 2 and 35 resident Type 1 fonts.

The printers will ship with LocalTalk, RS-232 serial and Centronics parallel interfaces. With VPT, they will support Ethernet. The devices also include a SCSI port for a hard drive.

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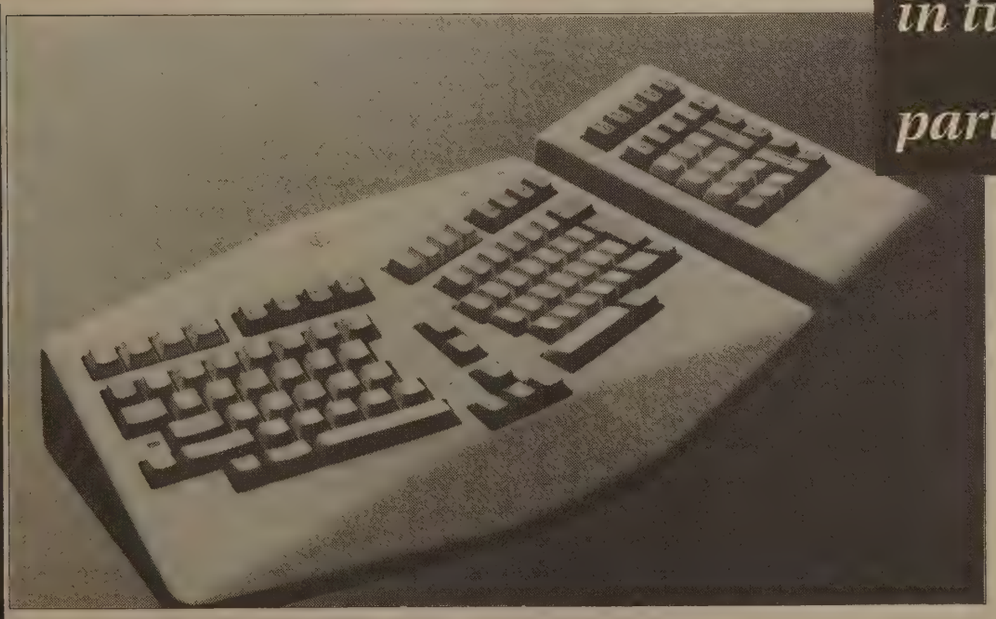
As portable computers get smaller and smaller, I find it increasingly necessary to have a good quality, full-size keyboard to plug into my portable at my regular work place. Strangely, however, it is becoming more and more difficult to find keyboards that are both small in size and have full functions. Most of the better keyboards these days are a bit too large to use while leaning back in a chair. For myself, I actually prefer to use a keyboard on a desktop, but I know many people who work with the keyboard on their lap. The common complaint I get is that the keyboards I like are too big for this use.

In my quest for a better keyboard, several years ago I started looking for a keyboard like the ones that were popular in the earlier days of personal computing. Basically, I was looking for a standard keyboard with a numeric keypad, which could be switched to function either as a keypad or a cursor control pad. No luck. There simply is not enough demand for these boards anymore.

Recently, I saw an announcement for an ergonomic keyboard designed in Germany that seemed interesting. In fact, I am writing this column with that keyboard. While it is small enough to hold on your lap, I am writing about this keyboard primarily for those of you who are having trouble with today's standard keyboards and are looking for an alternative.

Basically, the MiniErgo splits the standard keyboard in two parts, sloping to the sides and front at about a 40 degree angle. This design allows a more natural positioning of your hands and arms. The advantage to this is that your wrists can be held straight, rather than at the angle we typically hold our wrists when typing on a conventional keyboard, and thus avoid a major cause of Repetitive Stress Injuries.

The MiniErgo splits the standard keyboard in two parts.



Within the inverted V that is created by rotating the right and left halves of the keyboard, are the Insert, Delete, and cursor movement arrow keys arranged as an inverted T. The intent is that you will press these keys with your thumbs or first fingers.

My major complaint with the layout is that PgUp, PgDn, Home, and End functions are done through pressing the Fn key plus a cursor movement key. This layout hampers people who work primarily with text. Word processing demands dedicated keys for each of these commands.

There is also an imbedded numeric keypad, but you can get around this by purchasing the optional numeric keypad ($125) that is consistent with the basic design of the keyboard and sits to either the right or left of the basic unit. Unfortunately, the keypad does not double as a cursor control pad which would eliminate the need to use the Fn key.

The key action on the MiniErgo is good and my wrists truly are straight when I use this keyboard. It has not taken me long to get used to this new keyboard configuration and I am sure that within an equally short time my typing speed and accuracy will be back to normal.

The price for this keyboard is $179 and it carries a thirty-day satisfaction guarantee. If you are having trouble with standard keyboards this ergonomic alternative is worth checking out. With their guarantee, you have nothing to lose.

LAPTOPS

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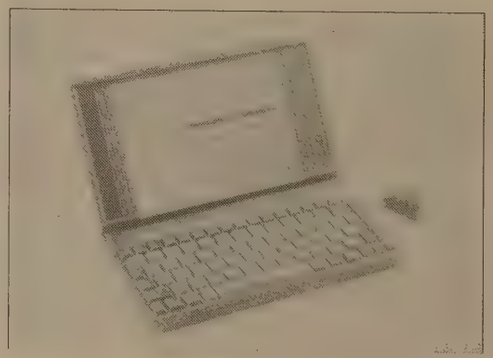
Hewlett-Packard doesn't seem to ever miss the mark these days. Their OmniBook 300 fills a niche that has been waiting for an innovative design. Several years ago, Hewlett-Packard introduced the 95LX, a palmtop computer that could be easily attached to a desktop personal computer. It featured a version of Lotus 1-2-3 built into ROM, which really made the 95LX wonderful for spreadsheet addicts. While there were other built-in applications, it was hard to make a case for this machine as a help to writers, the screen and keyboard were simply too small.

HP now offers the OmniBook 300, measuring 11.1" x 6.4" x 1.4" and weighing just under 3lbs. This is about as small as you can get and still include a standard-sized keyboard. The keys are not scrunched together. And although there is an Fn key that, among other things, invokes the numeric keypad, there are dedicated PgUp, PgDn, Home, and End keys. I could type on this machine all day. While the travel is not as great as my standard desktop keyboard, the only trouble I had was hitting the spacebar hard enough. I am sure that this is merely a matter of getting used to the touch of the OmniBook.

But the OmniBook has a lot more going for it than a good keyboard. This computer is the result of designing a subnotebook computer from the ground up. They did not just try to make a smaller and lighter machine. Rather, they thought about what the end-user would want and how to best provide it. The result is startling.



The display measures 9" and while not backlit, it is quite legible in most light. This design conserves power to increase battery life.

The OmniBook is powered by a 3.3v, 386SXLV chipset running at 20MHz. It comes standard with 2MB of RAM that is expandable up to 8MB. Because of the detail paid to all of the design features, it can run up to nine hours on the nickel metal hydride rechargeable battery pack. Additional packs ($99) are available. An AC adapter provides unlimited use as well as functioning as a battery pack charger. Recharges take about an hour and a half.

If you find yourself in a jam, you can use four AA alkaline or lithium batteries. This is the first portable I have seen that allows you to work without having to be concerned with battery life. There is also an icon on the screen illustrating how much charge is left in the battery pack.

The OmniBook comes in two different configurations. The less expensive model includes a 40MB hard drive. The alternative system uses a 10MB flash memory card. Although the OmniBook uses MS-DOS 5.0, memory compression software from DOS 6.0 is included, which can double the capacity for both the hard drive and flash memory cards. Although it has a higher list price ($2375), the configuration using flash memory cards gives longer battery life and seems to be more versatile.

The OmniBook is designed around a wide array of applications that are built into a removable ROM flash card. Included are Microsoft Word for Windows 2.0, Microsoft Excel 4.0, an appointment book, phone book, HP financial calculator, and Traveling Software's LapLink Remote Access. As you might guess, in addition to MS-DOS, Windows 3.1 is included in ROM. One advantage of having these

continued on page 162

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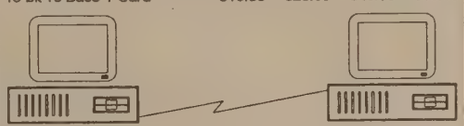

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Tips For Telecommuting Productivity

A Method For Achieving Greater Productivity

BY ROBERT MOSKOWITZ

Study after study reveals that telecommuters tend to be more productive than comparable office-bound workers. No one has yet documented why, but I suspect the main reasons include telecommuters' tight focus on the work they must accomplish while telecommuting, as well as their greater flexibility to apply themselves—minute by minute—to work that suits their preferences.

The underlying "focus" that makes a person 10–20% more productive once they start telecommuting can nearly always be tightened to make the telecommuter even more effective, and can be applied equally well to work done while in the office or while telecommuting.

As author of How To Organize Your Work and Your Life (Doubleday, 1981, revised and republished in 1993), I have focused much of my attention on the very areas where efforts to become an effective telecommuter seem to overlap with efforts to improve one's general level of productivity.

Here's a brief discussion of how to help yourself (and anyone who reports to you) accomplish more of what's most important—every working day:

TO BE MORE PRODUCTIVE, UNDERSTAND THE VALUE OF HAVING CLEAR GOALS

Aside from the inevitable practical problems, pitfalls, and delays of day-to-day work, there is a separate category of wasted time and misdirected energy that fills a good portion of every day. In the office, interruptions and rapidly changing orders or inputs from others rob you of your focus. While you're telecommuting, distractions or lack of self-discipline might be the main culprit. The problem: a shortage of clear, firm goals.

Consider for a moment the full range of responsibilities and opportunities you face when you telecommute (or when you are in the office). In this broad context, do you know exactly what accomplishments you're aiming for today? Do you have a plan for reaching each of the many goals you feel are important? Can you specify the goals your present activities are directed at achieving?

Unfortunately, hardly anyone can honestly answer "yes" to these three questions. Few people (including perhaps you, on certain days) have clear ideas about what goals to strive for, how to accomplish them, or what goals their current activities are helping to realize. This means they have no basis for choosing to focus on one task rather than another.

In practice, working more productively comes down to a basic series of choices concerning "What should I do next?"

Without a structure to give direction, your level of results and feelings of personal satisfaction tend to be controlled by external, possibly unimportant factors beyond your personal control. But this need not be true. Your level of productivity, achievement, and success are not determined by your genes. You've learned how to work to a certain achievement level by observing the world around you, by participating in situations, and by experiencing and emulating the people you've admired.

You can raise your level of productivity, achievement, and success, quite simply, just by starting to put more of your time and effort toward projects you determine to be the most important. At the same time, you can consciously avoid working on projects you deem less important. The result: a very tight focus on work that will lead toward accomplishing whatever objectives you have established for yourself.

TO BE MORE PRODUCTIVE, TAKE TIME TO ESTABLISH YOUR GOALS AND PRIORITIES

Note that you are not limited to setting only one goal at a time. You can simultaneously have as many goals as you like, with anticipated time frames ranging from one day to a year or longer. No matter. Working and telecommuting with specific goals in mind helps make you more productive regardless of how many goals you are trying to accomplish. Your satisfaction with each day's accomplishments will help motivate your efforts toward other goals.

To clearly identify your own goals for tomorrow and the foreseeable future, make three lists of ten "goals" you would like to achieve: one list for immediate job goals, a second list for medium- and long-term career or professional goals, and a third list for personal goals during the next ten years. For example, you might want to earn a promotion or a salary increase to a specific job

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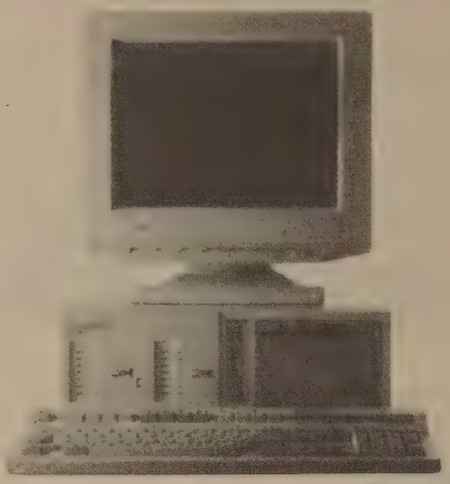

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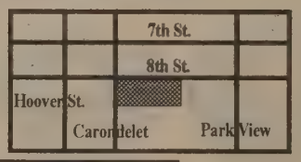

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TO BE MORE PRODUCTIVE, DETERMINE THE RELATIVE PRIORITIES OF YOUR IMPORTANT GOALS

Generally, most of the tasks you can do—whether you're telecommuting or in the office—lead toward only one of your goals. That's why it's important to place your goals in priority order so you know which ones should take precedence.

A simple procedure to determine these relative priorities (and remember, by definition all these goals are important to you) is to give each one a point score (1 to 10) for its "urgency," a second point score for its importance to you, and a third point score for its value in the larger context of your work and your life. Score each list of goals separately. Add up the scores and you get a preliminary priority ranking.

To refine this raw ranking, compare the goals in pairs. Start with the bottom two entries (number 9 and number 10) and answer the question: Which of these two is more important? Rearrange them if necessary to reflect your answer. Now make the same comparison for items number 8 and number 9. Work your way up the whole list, and then back down again. If necessary, repeat the entire cycle. After a surprisingly short while, you'll have the list in a priority order that makes sense. Repeat the process separately for each list of goals.

TO BE MORE PRODUCTIVE, UNDERSTAND THE IMPORTANCE OF ACTION PLANS

Prioritized lists of goals are important tools for improving your productivity. But by themselves they won't make a very big difference. The problem is that, whether you're telecommuting or working in the office, a significant action toward an important goal generally requires a fairly large investment of time, thought, and effort. What's more, there's generally a good deal of preparation, planning, homework, and coordination with others involved in any important project you undertake. You can rarely find time for more than one or two really important activities each day.

That's why you need to bolster your lists of goals with specific action plans. Once you have a plan for reaching a goal, you can more easily direct your efforts according to those plans. In the absence of a plan, your activities are far more likely to be controlled by events and distractions around you.

To prove this, compare your stated goals with the de facto goals you actually spend

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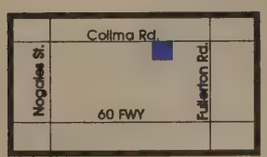

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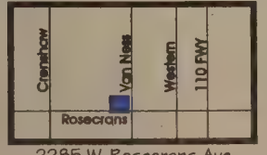

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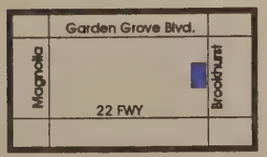

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time on. Analyze one day you're working in the office, and one day you're telecommuting. Assign each task you do to the goal it supports. For simplicity and convenience, don't bother assigning every action, just the ten most demanding and/or most time-consuming of the day.

If you're like most people, you'll find a great many of your important goals receive precious little attention or effort. You'll also find a great many activities without much purpose, or helping to achieve goals that never made it onto your "top ten" lists. Unfortunately, such activities often consume a fairly large proportion of your overall effort. If you try the same analysis for a whole week or a whole month, you'll probably find the pattern doesn't change very much.

TO BE MORE PRODUCTIVE, MAKE ACTION PLANS FOR ACHIEVING YOUR IMPORTANT GOALS

Suppose for a moment that you're interested in writing a symphony, starting a business, or going back to school toward earning a new degree. Each of these is a long, complicated, and difficult project that takes a good deal of time. Chances are you'll have a very hard time getting started, and may never achieve your goal at all, unless you create a detailed plan to follow directly toward your goal.

An action plan cuts the important goal into "bite-size" jobs you can do fairly easily. For example, if your goal is to write a symphony, you can break it down in your action plan into writing the overture and three or four movements. You can then break each of these down into the necessary number of musical passages, each with its own requirements. Once you've developed this action plan, you can follow it to write your symphony piece by piece, reserving a few minutes or an hour each work day to work on the next task, and feeling good when you finish each one.

Prioritized lists of goals are important tools for improving your productivity. But by themselves they won't make a very big difference.

You achieve the same increase in productivity whether you make a detailed action plan for a large-scale project or any other goal you'd like to accomplish.

TO BE MORE PRODUCTIVE, CHOOSE CAREFULLY WHAT YOU SPEND TIME ON NEXT

Obviously, you can't work toward every goal every day. Your time and energy are limited. But these limits don't prevent you from tightly focusing your efforts. In fact, the limits place a larger premium on organizing and controlling your efforts to make your opportunities yield as much of what you want as possible.

In practice, working more productively comes down to a basic series of choices concerning "What should I do next?" You

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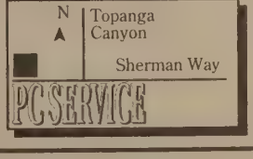

can ask yourself this question dozens, even hundreds of times a day—every time you finish working on something, every time you hang up the phone, every time you leave a meeting, every time your attention wanders from what you are doing.

Ideally, you answer the question with an item from one of your action plans. This immediately focuses your efforts toward achieving your important goals. Once you get in the habit of resisting the forces that try to make your day chaotic and carefully considering this basic choice instead, there's no hesitation in focusing your time and effort on the action items that will keep you working toward your most important goals.

SURVEY OF ATTITUDES FAVORS TELECOMMUTING

According to a recent survey sent to me by a reader, more than three-quarters of the working Americans who were polled said that important goals for them in the 1990s are to spend more time with family and friends, cut back on expenses, and have more free time. Nearly two out of five respondents claim they presently deprive themselves of needed sleep to have more time during the day. Nearly one-third said they don't have time on most weekends for what they'd really like to do. And more than one out of five claimed to have falsified a sick day within the last year to stay home from work for other responsibilities in their lives.

If you'd like to put a monetary value on telecommuting, here's one clue about how to do it: among employees earning more than $400 per week, nearly half said they'd give up a day's pay and work only four days a week, as a way to make time for other responsibilities in their lives. Among employees earning more than $600 per week, about seventy percent would willingly give up the extra day's pay.

(Even without knowing the exact source, I give some credence to these numbers because they agree with my own informal findings, and because the copy I received appears to have been printed in a magazine or brochure. If anyone can tell me the source of these numbers, I'd like to cite it in a future column.)

OFFICE IN A BRIEFCASE

In the last year or so, a number of computer vendors have begun to offer a complete "office in a briefcase." This tends to be some combination of a cellular telephone, a notebook computer, a computer printer, and a fax-and-data modem. Many of the units are sold complete, but others are modular designs that allow you to integrate any printer, any cellular phone, or any notebook computer that you may already have. The units are set up so all the equipment can be powered by a single source, which can be batteries, a cigarette-lighter adapter plug into your car or boat, or an AC adapter into the wall.

Expensive (ranging up to $9500 list price) and heavy (tilting the scales at 20 to 30 lbs.), these products are clearly not for everyone. Yet they are finding a market among people who need powerful communications and data-handling capabilities without being tied to a desk.

If any reader has had experience with this approach to telecommuting, please write or call me so I can report on the pros and cons of this fascinating technology. ■

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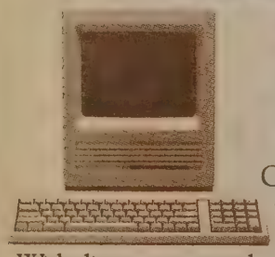

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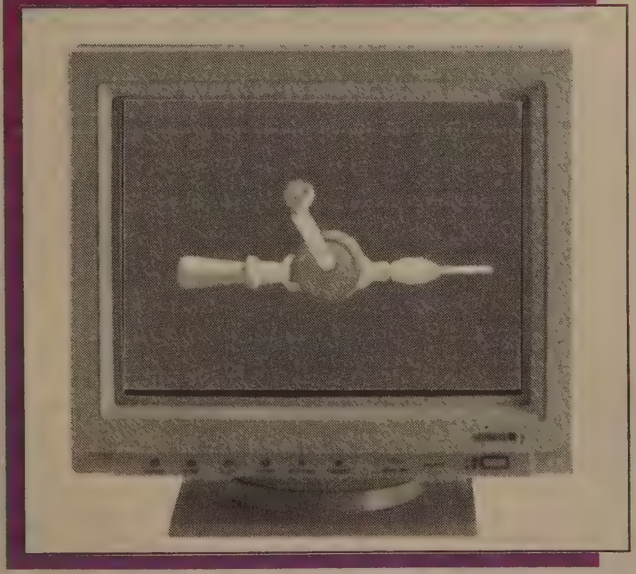

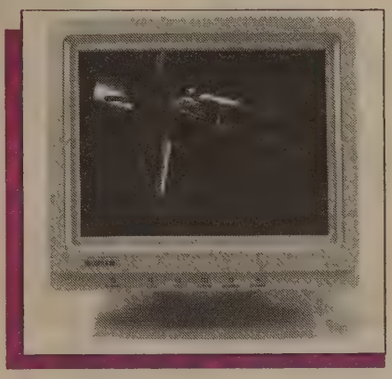

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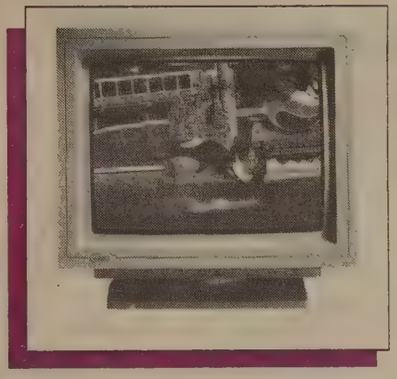

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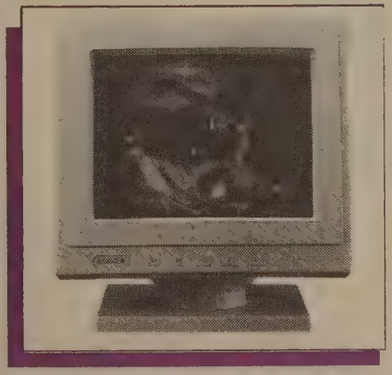

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⇒ 101 Enhanced Keyboard
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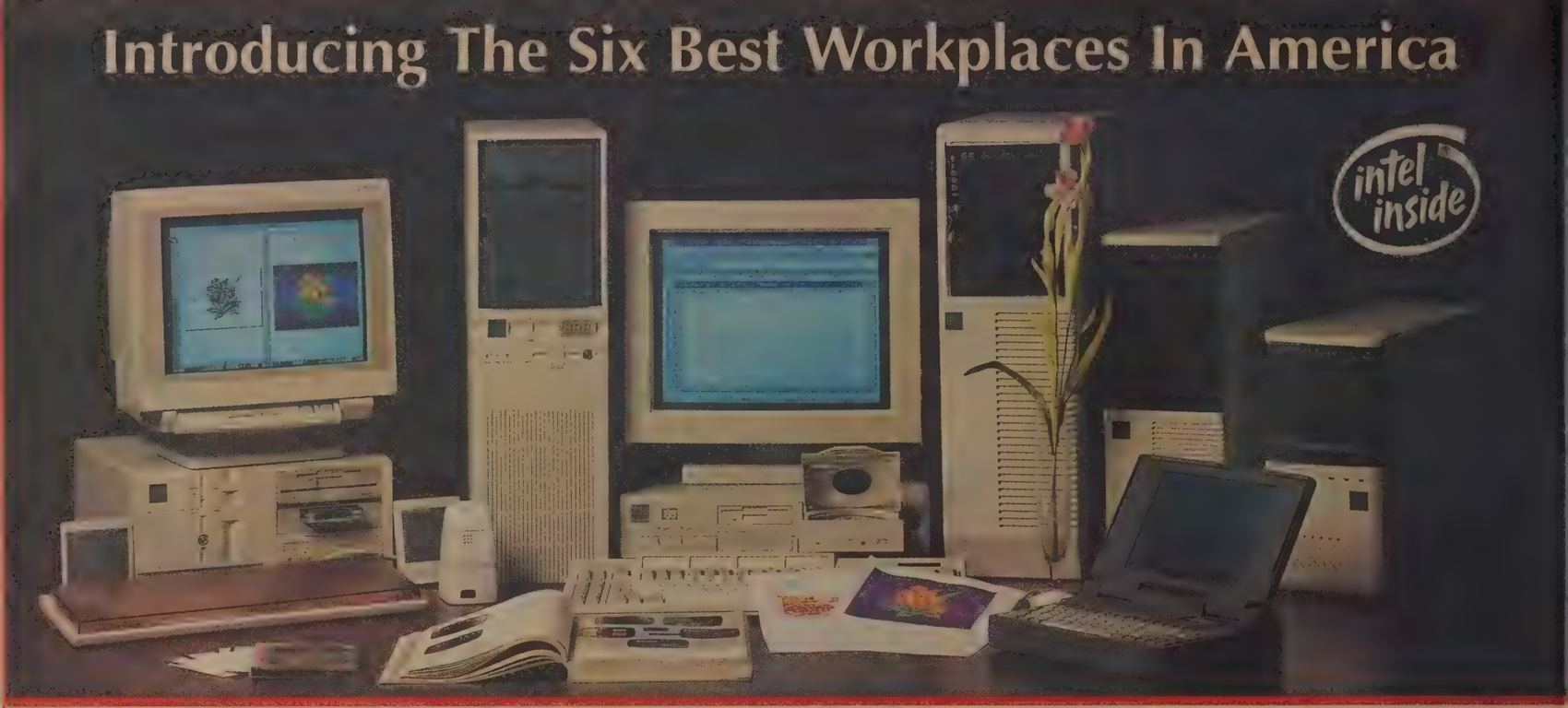

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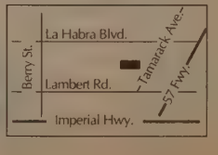

Adding Portables To Your Network

BY YACCO

RESOURCES:

EtherWave AUI Transceiver, $129
EtherWave AAUI Transceiver, $129
EtherWave ISA Card, $229
EtherWave NuBus Card, $229
EtherWave LC Card (for PDS), $229
EtherWave Mac/PB Adapter, $379 (available in December)
EtherWave Newton Adapter, $379 (available in December)
EtherWave Printer Adapter, $419 (available in December)

LANS

Farallon Computing, Inc.
2470 Mariner Square Loop
Alameda, CA 94501-1010
(510)814-5000

The Laptop Desk $199.95
American Business Concepts
4400 Sunbelt
Addison, TX 75248
(214)380-8724
1-800-877-4797

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Laptops connected to the network must be about as common as desktop nodes, if the proliferation of parallel-port network interfaces is any indication. Just a few years ago Xircom pioneered the first of these devices, and now virtually every vendor of LAN hardware seems to offer one in its line. Xircom is into its third generation, and now has PCMCIA versions for the latest round of miniscule portable machines.

In one sense, you can make a stronger argument for connecting a portable to the LAN than you can for connecting a desktop machine. Either type of machine can benefit from access to network resources, but a notebook, handheld, or pen unit also benefits from the ability to offload the data you collect in the field.

However, portable machines can pose logistical problems when they return from the field: Where do you put them? Do you provide a desk for every field agent, even if they spend most of their time out of the office? Those desks will take up a lot of floor space, and it's hard to justify the expense for a resource that will only see occasional use. And where do you connect them? Do you need to wire another drop for each of them? That's even more costly.

THE LAPTOP DESK

The Laptop Desk from American Business Concepts addresses the first of these issues by putting everything you need into a compact modular unit that functions as an inexpensive temporary work space. Its black-laminate desktop is specifically made to support lightweight portable machines. A cantilevered printer shelf supports printers up to 25lbs.—the weight of a Hewlett-Packard LaserJet IIIP printer. There's also a hideaway storage space for cables or power supplies, an adjustable copy holder, a utility tray for pens and pencils, and two organizer shelves for books and papers. The organizer shelves are just right for use as a pair of in and out boxes too.

The desk has another feature that adds to its usefulness with laptops: Lighting. A goose-necked halogen light clips onto the desk, from either side, using a quick-release system. It can make any LCD bright and easy to read under the dimmest conditions.

The unit's desktop can hold a laptop computer weighing up to 15lbs. It tilts up to 45 degrees to either side, so you can adjust it for right- or left-side access. The height of the work surface can also be adjusted, from 25" to 34"—allowing its use with almost any chair. At just 4", the base is low enough to slide under most office furniture, including wheelchairs, and it's mounted on small casters. Outside the office, you could even use the Laptop Desk from a recliner or bed, and its size is ideal for cramped home offices (whether you have a network or not).

This entire package fits into a surprisingly small area. Several Laptop Desks could squeeze into the space occupied by a standard office desk. But because it's designed to hang over a seat, while its base slides under it, most of the unit actually shares the same space as the user's chair. If you've already got the chair, all it needs is airspace. So, the Laptop Desk is not only convenient for use with trim computers, its footprint virtually disappears.

Xircom CEO Dirk Gates says,

"With Farallon's EtherWave transceivers for only $129, users can daisy-chain from their desktop to their Xircom-enabled laptop without having to wait for, or pay for, rewiring."

MAKING WAVES

Unfortunately, the Laptop Desk doesn't solve the problem of how to connect the laptop to your LAN. Fortunately, Farallon does.

The company has just announced EtherWave, an Ethernet transceiver that logically connects to 10BaseT in the same way Thicknet transceivers connect to a backbone. Xircom CEO Dirk Gates says, "With EtherWave transceivers for only $129, users can daisy-chain from their desktop to their Xircom-enabled laptop without having to wait for, or pay for, rewiring."

Just as Xircom's competition did with Pocket LAN adapters, I suspect Farallon's competition will soon be trying to clone EtherWave.

EtherWave transceivers aren't repeaters, and don't impact your repeater count. They combine transceiver and hub technologies, without reclocking, to allow you to daisy-chain nodes on a true 10BaseT net.

There are actually two main flavors of EtherWave: an external transceiver or an internal version that resides on a 3Com-compatible NIC. (Farallon uses 3Com's parallel-tasking Ethernet chips for the ultimate in Novell compatibility.) The internal cards have an SNMP agent built into their driver, so they can be managed through an SNMP console. External devices also have either a DIN-8 connector for your AppleTalk port, or an AUI cable to connect to your NIC. (LocalTalk versions work like a forwarder from LocalTalk to Ethernet.) Of course, not all 10BaseT cards have AUI connectors, but an external EtherWave will let you connect 10BaseT to any Ethernet card, including

continued on page 162

COMPUTER Shareware PROGRAMS

- ✔ *We compress all files to maximize disk space.*
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Drawing & Painting

AD0011 (3 disks) borders, corners, and frames for desktop publisher in pcx format

AD0020 a lot of very nice PCX clip arts

AD0030 Desktop Paint program for use with desktop publishing software

AD0031 (2 disks) 1-Cooper PCX clip arts 2-GrafCat graphics catalogue program

AD0040 Desktop Paint 256 color paint program for super VGA systems.

AD0050 Clip arts for desktop publishers

AD0060 Creative Graphics Archives with uniquely high quality clip arts

AD0070 1-Picture Label prints images from PrintMaster/PrintShop 2-Create/display mandel graphs 3-GIF viewer for EGA & VGA

AD0080 1-The Lighting Press Print Master Clone 2-VGA Paint drawing program

AD0090 1-KwikDraw object oriented drawing program 2-TheDraw color & monochrome screen Image generator/editor.

AD0100 Collection of hand-drawn graphics and templates for PFS:First Publisher

AD0111 EnVision Publisher full-featured desktop publishing with WYSIWYG, scalable fonts, drawing tools, import, mouse support

AD0120 1-Image Alchemy compresses, expands & converts images 2-Xmas card show

AD0160 GIF-Reed image viewer, printer, & converter, with PuzzleFun & slide shows.

AD0170 1-GDS graphics image enhancer and viewer with slide show 2-PrintPartner makes printed banners, signs, and calendars

AD0180 1-VGA Dancing patterns 2-Japanese PCX clip arts 3-PCX clip arts

AD0191 (3 disks) Medical PCX clip arts

AD0201 (2 disks) 1-Architect PCX clip arts 2-Office PCX arts

AD0211 (2 disks) Travel clip arts in PCX

AD0220 soft fonts utilities: 1-FontTable gets fonts details 2-FontEdit 3-Font Loader

AD0230 Advertising clip arts

AD0240 (3 disks) Fictional PCX clip arts

Picture Collections

AP0011 (5 disks sets) Pictures of models & sexy girls in swim suits. Specify # of disks in multiples of 5 disks only like 5,10,20, etc.

Animation/Slide Show

AS0010 3-D animation of a flying jet

AS0021 (4 disks) Crystal Dream with superb music and VGA animation

AS0030 animation, desk lamp riding a ball

AS0040 1-Animation, skeletons walk in cemetery 2- StarTrek going to warp speed

Picture Viewers

AV0010 Icon conversion software

AV0020 Slide show and visual effects

AV0030 1-Grabber screen capture program 2-GIFPrt displays and prints GIF images 3-ANSI Digitizer. Req VGA

AV0040 1-Create 3-D charts 2-View GIFs on CGA/HGC 3-Dave's TGA animator 4-converts GIF to BMP

AV0050 1-DL-View for .dl files 2-Flick animation/audio player 3-Convert b/w PCX to gray shaded GIF 4-make self-displaying GIFs

AV0060 Improves- the premier image enhancing, painting and editing program.

AV0070 1-VuGIF displays GIF Pictures 2-Viewer for PCX files 3-VGA clown demo

AV0080 1-VPIC image viewer/converter for EGA+ 2-Play73 Trilobite SVGA flick & groovy player 3-Show utility 4-TV animation

AV0090 1-Autodesk animator and player 2-GIF cropper 3-CompuShow displays images

AV0100 DanCad3D 3D-CAD & animator

AV0110 Graphic Workshop for DOS is a program for working with bit-mapped images.

AV0120 1-Autodesk AutoFlix converts slide/rendering files 2-GIFLite compresses GIF files by 30% 3-GIFPrint view/print GIFs

AV0130 1-CompuShow image viewing, & slide shows 2-DeadPaint remote imaging paint program; animator/view 3-GIFDir info on GIFs

AV0140 3D CAD rendering program with full complement of 3D drawing/editing tools.

Business Software

BA0010 Dayo 'Little' POS- Point of Sale Billing & Invoicing abbreviated version

BA0020 Dayo Billing & Invoicing - Returns & Refunds Module

BA0030 Dayo AP to process purchase orders and other expenses

BA0040 Dayo Rental POS- Point of Sale Billing and Invoicing for Rental Companies

BA0050 1-Dayo Return Management 2-PC-Agent database/prospect card filing

BA0060 Dayo Point Of Sale- Billing & Invoicing software

BA0070 Dayo Payroll computes payroll for any size business

BA0080 Dayo Accounts Receivable for processing & maintenance of your receivables

BA0090 Dayo EOP - end of period pack & inventory

BA0100 Dayo General Ledger (GL)

BA0110 Dayo Billing for businesses that require more formal or detailed invoices.

BA0120 1-Dayo Shipping Log 2-RAM Base Accounting for point of sale, and business record keeping

BA0130 1-Home Office Tax calculator 2-Home Budget Management System

BA0140 The Fund Accountant for accounting functions, fixed asset/liabilities, payroll, checkbook, & budget records

BA0150 Account Plus accounting system

BA0160 Finance Manager II - Accounts Payable Lite

BA0171 (2 disks) 1-The Fixed Asset Manager 2-PC-Books bookkeeping software

BA0180 1-Accounting 101 2-MAE-Management Action Expert software

BA0181 (2 disks) ZPay Payroll System-powerful and easy to use stand alone system

BA0190 CheckMate Plus full-featured, easy-to-use, checkbook accounting package

BA0200 CASE - Consulting and Small Enterprise Accounting System specially designed for consultants, designers, etc.

BA0211 (2 disks) Fixed Asset Manager

BA0220 Medin Accounting software for small and medium size businesses.

BA0230 Finance Manager II 1-Accounts Receivable Lite 2-General Ledger Lite

BA0240 1-Inventory Sort for small inventory lists 2-Micro Accounting System

BA0250 1-Inventory Plus 2-WYS-AR Accounts Receivable Program

BA0260 The Nonprofit General Ledger

BA0270 OverLord organizes and controls records/accounts of members, tenants, etc.

BA0280 1-Payment Book Writer 2-Paytime Payroll program

BA0290 SOAR, Service Oriented Accounts Receivables system

BA0320 1-Finance Manager II Payroll Module Lite 2-The Sumple Bookkeeper

BA0330 1-PC-Deal double entry accounts ledger 2-PsLeger personal finance recorder

BA0330 1-Business Plan Master 2-PC Billing invoicing system 3-CarMate auto maintenance File

BA0340 1-Rosewood Journal- sales journal and accounts receivable 2-SPC Accounts Receivable

BA0350 1-Single Entry Bookkeeper for business/home 2-The Billit prints invoices statements purchase orders. Laser/dot matrix;

BA0361 (4 disks) Painless Accounting fully integrated accounting; general ledger, billing, accounts receivable, accounts payable

Business Management

BM0011 (2 disks) Immigration Tracking

BM0020 1-PC-Speedy Mailer 2-Phone-A telephone dialing program

BM0030 1-AZ Real Estate Investment and Finance 2-Bid Buz estimating program

BM0041 (2 disks) The Donor Network manages your donation, fund raising activities

BM0050 Pds*Quote quotation & bid estimating system for any type or size business

BM0060 1-The Complete Automobile Reporting 2-PC-Estimator- estimating system

BM0070 Service Plus relates service or maintenance activities to parts, objects, items.

BM0080 Sitter- Placement Service System for Baby Sitting and Respite Care businesses

BM0090 1-Police Records System 2-Sign Out keeps track of workers whereabouts

BM0100 1-RealQuick real estate management system 2-Real estate info.

BM0110 1-Land Surveying System 2-Survey land yourself and save money.

BM0120 1-REIPS Real Estate Investment Projections System 2-Rental property analysis

BM0130 1-Real Estate System 2-Realtors' financial calculator 3-Print W2 & 1099-Misc.

BM0140 1-VmSys Plus maintains vehicle expenses 2-Examine real estate descriptions

BM0150 1-Landscape Plant Information System. 2-Moon Lighting Advisor

BM0160 1-Certificate Creator helps you produce certificates, awards, commendations, etc. 2-FormGen Fill form filling system

BM0170 FormGen II - Form Generator II is the most popular form making package

BM0191 (2 disks) 1-Make A Mess powerful visual tool to display messages/ads on monitor 2-Master*List database manager

BM0201 (2 disks) 1-Contact Plus contact management system lets businessmen organize phone calls, notes and appointments 2- collection of 594 business and legal letters

BM0210 1-Contact Manager for small to mid-size businesses; zip code sorting, labels, mail merge 2-Business Planner for small business structuring/startup

BM0220 CraftTracker home business manager to record the figures needed for IRS Schedule C as well as state sales tax returns.

BM0230 1-Almanac personal info. mgr. with calendar, card file & biorhythms 2-ApCal appoint/calendar 3-Lawsuit/Asset Protection

BM0240 1-Automotive calculations for auto work 2-AutoMinder preventative maint. tool 3-Public Address does labels, envelopes

BM0250 Receptionist computerizes job of a secretary. Take phone messages; maintain contacts info/appointments. Req color, 1mg dsk

Communications

CM0010 BGFT background file transfer

CM0030 1-FaxCtrl control fax/answering machine on one telephone line! 2-HS/Link external protocol 3-StarDial stand alone auto dialer for Starlink system

CM0041 (2 disks) BitFax S/R for Send/Receive fax modems class 1.

CM0050 1-ElseWare PC remote access program 2-ATSend sends commands to modems 3-Autopuma a script for Telix 4-DSZ Zmodem protocol

CM0060 1-Fax cover prints personalized fax cover sheets 2-ESCOMM comm program. 3- Hi-Speed provides info on fast modems

CM0070 1-HSLink external high speed, full streaming, bi-directional, batch transfer protocol driver 2-HSLShell for HSLink

CM0080 1-MPt protocol for PC-to-PC data transfer through a serial link 2-Modem Doctor 3-PageMe paging program

CM0091 (2 disks) QModem comm software with superb capabilities

CM0111 (2 disks) Telemate powerful comm program with editor/viewer, huge back scroll & mouse support gives OS/2 like power

CM0121 (2 disks) 1-GtPower16 links computers for conversation & file transfer 2-CheckIRQ shows COM ports/IRQ numbers 3-Powermode Jmodem/Zmodem shell

CM0130 Cedar Island Link elegantly simple to use mouse based comm program with auto GIF viewer (SVGA); 300-100k bps.

CM0141 (2 disks) 1-Ripterm graphical, full-featured comm program 2-Transfer data between PC's at 19200bps 3-MyComm powerful comm program for calling BBSs.

Data Base

DB0011 (3 disks) File Express database management. Enter names/addresses; sort by zip code/last name; print mailing labels. Write form letters by merging names with a letter.

DB0020 Data Master database manager: Create, modify, sort, report, query dBase files.

DB0030 1-SoundZ librarian for tapes, CD & records. 2-DBF-View dbf file viewer/editor

DB0041 (2 disks) 3 cataloging programs: 1-Cassette Master 2-Album Master 3-CD Master. print listings/inserts. Req graphic prtr.

DB0050 Ultimate Mail List Manager manages sales prospects and customer lists.

DB0060 EZbase Database Management create,add,edit,browse,query,report 2-Convert data files from one format to another.

DB0070 1-Book Librarian organizes and manages personal, club, school, church library 2-HoldAnything keeps track of anything

DB0080 Wampum the ultimate database, can be loaded as a 20K TSR; supports dBASE and PCX graphics fields. Multi-user. LAN

File/Disk Compression

DC0010 1-PkInsert adds comment to .zip files 2-PkLite compresses .exe & .com files 3-PkLiteFix makes pkhtml files unextractable

DC0020 1-FlexBak Plus hard disk backup system 2-The Configuration Manager (TCM) and Boot Control Program 3-Dir Match

DC0030 1-PkZip file compression utility 2-Format low-density diskette to 800k

DC0040 1-Shez compression shell for zip, lha, zoo, arc, arj, etc. 2-Split breaks files into smaller files 3-Strip zip file comments 4-Subzip compresses & expands sub-directories

DC0050 1-Arj file compression utility 2-Zipfile shell utility for PkZip v1.1 - v2.04g

Word Processors/ Editors

DE0010 1-SageWord powerful, fast word processor 2-TypeRite electric typewriter

DE0020 Boxer- full-featured text editor with multi-level undo. Supports mouse, EGA, VGA 28/43/50 lines, macros, WP and more!

DE0030 1-EdWord a professional full featured, multi-file text editor 2-Handbook prints 3.5" by 5.5" handbooks from text files

DE0040 WordPerfect 5.1 Spanish dictionary and thesaurus

DE0050 1-Readability Plus analyzes your writing skill 2-ZipZap lets you to view and/or modify a file or disk sector by sector

DE0061 (2 disks) PC-Write full-featured word processor program

DE0070 ByDesign desktop publisher for WordPerfect gives you a design studio power.

DE0080 Breeze word processor with mail merge, dictionary, readability analyzer, print spooling and much more.

DE0090 1-Power Edit multi-window full featured file editor 2-NoteWare the ultimate 16K! TSR notepad, unlimited notes, cut, copy, paste, export, full screen editor, word wrap.....

DE0101 (2 disks) 1-JORJ concise 58000 word English dictionary 2-JSpell spell checker

File/Directory Managers

DF0010 Advanced Menu System is easy to use, compatible with Novell menu script file with Syscon like operation & built in powerful features

DF0020 1-Automenu lets you easily access your frequently used programs 2-File Finder Pack 3-Easy-Edit simple text editor

DF0030 1-ElfTree Packs 100's of fast file, directory and program management utilities in one package 2-List file browsing utility

DF0040 1-DF small, fast file manager with advanced user-defined functions & Smart Viewers. 2-Target file locator & manipulator

DF0050 1-Stupendos replaces DOS commands with easy to use commands using pull down menus 2-Xtree file and directory manager lets you run, delete, rename, view, move, list, or show any and all files

DOS Utilities

DU0010 Help! is a DOS shell for copy, erase/format/move/locate/view/print & more.

DU0020 Ticklex advanced scheduler, tickler, & calendar to track time and money.

DU0030 1-Toggle Clock memory resident clock 2-TimeSet 3-ModPlay plays Amiga sound tracker files on a PC

DU0040 1-ASCIIFont creates title screens 2-Use mouse instead of arrow keys 3-Type with 1 finger 4-Draw color boxes in .bat files

DU0051 PC Magazine Labs Benchmark Series looks "under the hood" of your machine and provides intensive tests of its components.

DU0060 1-Extensive diagnostics of computer 2-Frank.387 coprocessor emulation 3-DMP Printer driver/spooler

DU0070 1-Pretty Good Privacy is a high security cryptographic software 2-Today tells what historic things happened today in history

DU0080 1-LabelIt labeling program prints multiples of same labels 2-On-Side sideways printing 3-XDir replaces DOS dir command

DU0090 1-Mr. Label full-featured labeling program for dot-matrix/laser printers 2-Printer utilities: LQ, Letter Head, Edit Char.

DU0100 1-DOSMax & FreeLoad lets you maximize low memory usage 2-Doc2Com makes self-browsing text files 3-PCopy better than DOS Copy 4-HI displays random quotes

DU0110 1-HyperWare speed tools optimizes Disk, Keyboard, & Screen access time. 2-Buffit screen text capturing program

DU0120 1-Memory Management Kit for DOS 5 2-Silence PC speaker 3-Sleep your PC 4-Silvester/Tweety clock 5-Pink Panter Clock

DU0130 1-Asq analysis & training product 2-3D benchmark for VGAs 3-Boot from B: 4-CMOS setup 5-Drive Table 6-Epson Set

DU0150 1-ReSume helps create effective resumes 2-BlaqueBook is a PC address book 3-Financial Cookbook for business & home.

DU0160 1-Resume Shop helps you prepare effective resumes 2-ProRol complete name, address & phone number rolodex

DU0170 1-4Print/4Book for LaserJet, Desk jet prints 4-6 pages per sheet single, double sided & prints great-looking booklets 2-Bar2Exec compiles batch files (ASM src)

DU0180 1-FormatMaster floppy disk formatter 2-Professional Optical Character Recognition 3-Background Disk Formatter

DU0190 1-JetPilot controls Laser printer 2-ZapCode printer control 3-ZipCode4 prints zip/zip+4 postal codes on 24 pin printer

DU0200 Control Panel shell with menu, disk, DOS, desktop & communication utilities for fast, easy software/operating system access

DU0210 1-Batch Enhancer adds sound, color, box, menu, directory control to batch files 2-DiskBase software info. database

DU0220 1-xDisk creates variable-size ram disks 2-RighTime corrects PC clock errors 3-System configuration information 4-TymSet for PCs that drift 20+ seconds per month

DU0230 1-Amiga Emulator runs Amiga software on PC 2-28 PC Magazine utilities on video, memory, hardware, printer, serial,..

DU0231 (2 disks) PC Magazine Utilities Disk with 35 utilities for PC, screen, file, hard disk, key board, and printer management

DU0240 1-Findum finds duplicate files 2-Scrollit captures color text screens 3-Mac-In-DOS reads/writes Macintosh 1.44mb disks 4-SrDisk resizeable ramdisk

DU0250 1-NeverLock copy protection removal utility 2-Skull Prompt EGA/VGA fonts for DOS applications 3-Where finds any file on your drives; Also finds duplicate files.

DU0260 1-Memory Management Kit 2-DOSamatic powerful multi-tasker 3-BatCom converts .bat to .com 4-Snoop aids in remote tech support & on-site problem analysis 5-MebWalkr for debugging/learning other TSRs

Virus Detector/Remover

DV0010 VirusScan by McAfee Associates

DV0020 Clean virus remover by McAfee

DV0030 1-Vshield memory resident virus prevention program 2-The Virus Terminus shell menu utility for VirusScan & Clean.

DV0040 F-Prot menu driven anti-virus program prevents execution of any virus infected program and searches files for viruses

Children Education

EC0010 1-EGA Mouse Paint 2-Spell Castle 3-Brandon's Lunchbox (USA, Boxes).

EC0020 Kid Paint EGA VGA painting pad

EC0030 1-Word Processing for Kids 2-Balloon Speller

EC0040 ADVENTURE MATH: Educational Game (Epics Megagames)

EC0050 1-Animals Math 2-Children's Graphics Program 3-Dad's Choice

EC0060 1-Mom's Math 2-Word Flash 3-Hangman for the Super-intelligent

EC0070 Preschool educational programs 1-Teach-A-tot 2-USA 3-TellTime 4-TypeTest

EC0080 1-Magic Crayon 2-KinderMath

EC0090 EGA Coloring Book lets children use over 500 colors/patterns to color pictures

EC0100 1-Beginning Sound 2-Animated Brontosaurus Walk 3-Brandon's Lunchbox

EC0110 1- 123-Talk with human voice 2-VGA Concentration tests memory skills.

EC0120 1- ABC-Talk with human voice 2-Fun with Designs kids drawing program

EC0130 Spellbound! kids spelling tutor

EC0140 Educational programs in Music, Algebra, Songs, Chemistry, Spelling Bee, etc.

EC0150 1-Choose baby's name 2-Number Magic 3-Hangman, Alphabet, Animals, ClockGame & Mosaic educational programs

EC0160 Play 'N' Learn

EC0170 Word Gallery helps children 3-up associate words with the objects

EC0180 Hangman for Students helps children learn their grade school level words

EC0190 Funny Face II allows kids to combine noses, ears, hairs, etc. to make faces

EC0200 1-School-Mom educational tools for ages 4 to 14. 2-Coins in the Box

EC0210 1-Picture Magic 2-Work Book 3-Strudle drawing and painting program

EC0221 Talking Teacher For Sound Boards with real human voice teaches children 1-17 how to talk, alphabet, read, write, & spell

EC0230 1-Origami teaches how to fold a piece of paper into various shapes 2-Airplane prints folding pattern for many paper airplanes

EC0242 Early Spanish Bi-Lingual educational program with real human voice for children age 1-14, Req EGA+,sound board

EC0250 1-ABC Fun Keys nursery rhymes, animation games for preschooler 2-Megan's Matching Game for windows challenges small children to match pairs of objects

EC0260 1-World statistical atlas for 160 countries 2-Ann's Math Tutor teaches/tests addition, subtraction, multiplication, division

General Education

EG0010 1-Hangman Basic, Educational, Literate and Personal levels 2-MathPlot mathematical function plotting system

EG0020 1-Periodic Table for Windows 2-Physics for students

EG0030 1-Type Trek typing tutor in game format 2&3-Acrostix & Kaypro computer games which encourage creativity and thinking

EG0040 1-Computer Trivia Quiz 2-Life

EG0050 Super Pro Word Search allows a person to create "circle-the-word" puzzles

EG0060 1-Series of programs physics and space science programs 2-Silicon Sky turns your computer into a planisphere

EG0070 Computer Tutorial software

EG0080 science programs: 1-MoonBeam 2-Solar 3-Hurricane tracker 4-Sunset 5-SKY

EG0091 (2 disks) Electrical reference data base

EG0100 1-Electric electrical formula calculator 2-MIPS learning program

EG0110 1-Phrase Craze guess the phrase game 2-Crazy Shuffle challenges memory skill

EG0120 1-Brainscape adventure game in Neuroanatomy 2-The World Name Game 3-Crime Lab investigation game 4-TriSkelion

EG0130 Science programs: 1-Astronomy 2-Astrosoft Computerized Ephemeris

EG0140 Science Software Package for science education students

EG0150 Science programs: 1-StarView 2-Jupiter Satellite Simulator/Charter 3-StarFind

EG0161 (2 disks) KwikStat statistical data analysis package

EG0170 1-Oxy-Aceiylene Welding course 2-ImpShell expert system developmg program

EG0180 1-EzCosmos sky plot software 2-View sky 3-Astro astronomy program

EG0190 SkyGlobe fast, fun, and easy astronomy program

EG0201 (3 disks) Navigation Series for aid in boating and sailing activities

EG0210 1-R U ready for business calculus & calculus I? from UA Mathematics Department 2-Calculus for Windows

EG0220 1-Math Castle educational math game with 40 play levels 2-Voyage to the planet earth geography knowledge EGA game

EG0230 1-What's In That Box? shows how your computer works. Req graphics card 2-The Oakflat Nuclear Power Plant Simulator

EG0240 1-Electrical-Electronic Formulas 2-Electronics Tutor graphical program, CGA+

EG0250 1-PC-Jigsaw draws & shuffles pictures,You re-make them 2-Moon Manager: locate moon mountains, valleys, Apollo sites..

EG0260 1-AlgebraX tutor with 5 levels of difficulty, and step-by-step problem solutions 2-HyperGeo investigates 4-D hyperspace. 3-First course in computer system and use

EG0271 (2 disks) 1-Math Helper for lower division college/high school students, teachers 2-High School & College Algebra

EG0280 1-Physics teaches properties from a graphical "physics property chart" (like periodic table) 2-Solve differential equations

English/Foreign Language

EL0010 German Language Teacher

EL0020 Japanese for Business and Travel

EL0030 1-Advanced English Computer Tutor is an innovative English language style tutorial 2-Atlas: a computer-based USA Atlas

EL0040 Gakusei Japanese language tutor helps Japanese language students master the Japanese grammar and usage. Req. EGA+, HD

EL0050 1-English Language Teacher with flash cards, 7500 word vocabulary builder & a spelling teacher 2-Spanish I tutor with 100s of word combinations & verb conjugation forms

Typing Software

ET0010 1-Typefits (utilities similar to typewriter 2-Touch Type Tutor

Personal Finance

FP0010 Express Check is a full-featured checking account & budget manager.

FP0020 1&2-Amortize calculator & table

FP0030 1-FastBuck 2-Financial calculator

FP0040 1-Amortize 2-Loan analysis 3-Dealership sales analysis 4-Auto loan analysis

FP0050 1-Capital Needs (insurance) Planner 2-Various financial calculators

FP0060 Capital Gainz portfolio manager

FP0070 MarketPlus Technical Analysis Software: a full-featured investment manager

FP0080 1-BankBook home finance manger 2-CashTrac personal finance manager

FP0090 1-Information Palace tracks coins, stamps, addresses, phones, magazines 2-Video Madness database for video tape collections

FP0100 1-FamTrack home finance manager 2-CheX checkbook program

FP0110 1-Checkbook Management for personal & small business checking accounts 2-Loan Warrior amortization program.

FP0120 1-MultiAssistant multi-function softwr for home/business 2-CheckBook mgr

FP0130 1-PC-Portfolio analyses your stocks, bonds, mutual funds, etc. 2-CheckStar checkbook, income/expense maagment system

FP0140 1-Wall Street personal investment record keeping software 2-Mark's checkbook+

FP0150 1-The Time and Money Financial Monitor 2-Genesis The Checkbook Program

FP0160 1-Refund tracks manufacturer's refunds 2-Varamort amortization program 3-ExAcct Financial Account Record keeper

FP0170 1-Cash Control checkbook management system 2-ZCalc loan calculator

FP0180 1-Exchequer checkbook program 2-Credit Interest Check 3-LoanStar

FP0190 1-Qpacs Quick Personal Accounting system 2-LoanPrint loan calculator

FP0200 1-Pc-Bill Master 2-Loan calculatr

FP0210 AM-TAX the 1992 Tax Software

FP0220 1-PC-Money maintains personal, & small business financial/tax records. 2-PC-Flow personal cash flow budgeting system

FP0230 1-The Inside Secrets Of Credit Repair 2-CarTrack tracks your automotive mauntenance 3-Calendar displays the calendar

FP0240 File Express powerful easy-to-use database management for name/address lists, inventory, accounting, and other data.

FP0250 1-Homeware home inventory, car expenses, shopping list, name/address list program 2-RemindMe scheduler & reminder

FP0260 1-Personal Record Keeper system 2-Portfolio Analysis Worksheet for Lotus 123 3-Turbo Check

FP0270 Fair Warning! smart tickler file for people with many events to keep track of in their lives (like Birthdays, Anniversaries...)

FP0280 1-Home Plan lets you draw, save, edit, print house plans. Req. VGA & printer 2-FoneBook easy to use address book

FP0291 (3 disks) Home&Business Legal Guide & Forme Generator; 200+ legal forms for wills, living trusts, real estate, business, corporate, partnership and more. Req HD

FP0300 1-TreePlan decision tree for structuring risky decisions. Solve for optimal strategy 2-NameBase address, phone, note mgr

FP0310 1-Tax Check estimates IRS tax liability 2-Mortgage Reduction: Giant savings for homeowner 3-How to start home business

Apogee Games

GA0010 Captain Rogers in the Battle for Earth VGA action/adventure arcade game

GA0020 Dark Ages arcade/adventure game with superb graphics and animation

GA0030 Commander Keen - Episode 2: Invasion Of The Vortices

GA0040 Commander Keen - Episode 6: Aliens Are My Baby Sitter! adventure-arcade

GA0051 (2 disks) Spear of Destiny: VGA commercial successor to Wolfenstein 3D!

GA0060 Duke Nukem - Arcade/adventure game that compares to the Sega Genesis game

GA0071 (2 disks) Wolfenstein 3D - A high-action arcade/strategy VGA+ game

GA0080 Wolfenstein 3D utilities: 1-map editor 2-Cheat, never die 3-wall editor 4-maps

GA0090 Utilities for Duke Nukem: 1-Duke Nukem Extension Set 1 &2 2-Maps

GA0101 Major Striker with triple-parallax scrolling adding to the illusion of depth and danger. AdLib & Sound Blaster, EGA/VGA

GA0110 Arctic Adventure arcade game

GA0120 Crystal Caves EGA arcade game

GA0131 (2 disks) Cosmo's Cosmic Adventure arcade game, with amazing 3D feel

GA0141 (2 disks) Enigma's Nightmare II **for Wolfenstein3D version 1.1+** is new set of harder levels with more guards, action, blood

GA0150 Gory Graphics replacement **for Wolfenstein 3-D version 1.0;** Make guards heads explode & dogs lose a gallon of blood!

GA0161 (2 disks) Commander Keen in Good-bye Galaxy adventure with EGA, VGA graphics, smooth animation! AdLib music

GA0171 (2 disks) Street Fighter II replacement graphics **for Wolfenstein 3D version 1.0;** Fight Ken, Ruy & E Honda.

GA0200 Paganitzu puzzle-oriented CGA EGA VGA arcade/adventure game tests your mind more than your finger speed.

GA0211 (4 disks) Enigma's Nightmare III is the biggest, baddest, final alternate graphics & maps **for Wolfenstein 3D version 1.1+.**

GA0221 (2 disks) Monster Bash "Lite" arcade adventure, EGA/VG; 3 skill levels

Board/Card Games

GB0010 1-Picture Puzzle makes you put back together a scrambled picture 2-Pinochle

GB0020 1-C_Chess Chinese Chess 2-Cyber Chess with sound & VGA animation

GB0030 1-Video Vegas casino games of Lucky 7 Slots, Draw Poker, Keno & Black Jack 2-Baccarat card game 3-Crazy Eight

GB0050 1-Craps EGA/VGA casino game 2-Monopoly VGA board game for the family

GB0060 1-Poker Galore! simulates Las Vegas poker machines 2-Two-Bit-Poker casino game 3-Lucky 7 slot machine, EGA+

GB0070 1-PC-Gammon challenging EGA VGA backgammon game 2-Power Chess 3-Domino 2 person, 11 draw, 1 spinner game

GB0080 1-Draw Poker Tournament Req. CGA/EGA 2-Keno simulates a Vegas keno machine 3-Lowball Poker Casino style game

Epic Megagames

GE0010 Epic VGA action puzzle game

GE0021 (2 disks) Overkill arcade game

GE0031 (2 disks) Kiloblaster arcade game

GE0040 Supper ZZT arcade-adventure journey through a 7- level monster zoo

GE0051 (2 disks) Castle of the Winds fantasy roll playing game for Windows 3.xx

GE0061(2 disks) Solar Winds fast-action game with VGA graphics, musical sound track

GE0071 (3 disks) Dare to Dream: VGA+ adventure game for Windows. Explore many vividly-illustrated areas. Ever-changing sound

GE0081 (3 disks) Ken's Labyrinth: 3D virtual reality VGA arcade game

GE0091 (4 disks) Zone 66 ultra high-tech cinematic arcade game with Sound Blaster & Gravis sound track for 80386+ VGA PCs.

GQ0060 Jill of the Jungle 256-color VGA arcade-adventure game

Martial Arts

GM0011 Martial Arts Training Information

GM0020 Kungfu Louie

GM0030 1-Sierra Boxing arcade game 2-Stick Fighter II martial arts game

GM0040 One Must Fall arcade martial art VGA game with excellent animation & sound.

GM0051(2 disks) Executioners fighting game for mortals with guts to play. Awesome VGA graphics; Req. 80386+, 1meg exp mem.

Arcade Quality

GQ0010 Moraff's Escapade game with 5 versions for many VGA/SVGA systems

GQ0020 1-JumpMan Lives arcade VGA game 2-Moraff's Pinball for EGA/VGA

GQ0030 Bolo Avengers I mind boggling strategy game. Req EGA/VGA.

GQ0040 Space Goose action arcade game.

GQ0051 (2 disks) Galactix VGA space arcade game with Sound Blaster sound

GQ0070 Fairy Godmother arcade/logic game of magical mayhem VGA+

GQ0101 (3 disks) The Catacomb Abyss captivating 3Dfantasy trip to other dimensions

GQ0110 1-Bricks 2-Fortune 3-Kong 4-Pango 5-Golf 6-Pitfall 7-Pyramid 8-3Demon

GQ0130 1-Dungeons of Drakllor EGA+ arcade game 2-Moraff's Entrap logic game 3-Dragons Shard EGA/VGA fantasy role playing

GQ0140 Moraff's World the ultimate VGA/SVGA dungeon game, 25-level deep dungeons with monsters with fangs and claws.

GQ0150 1-Bolo Adventures III mind-boggling strategy game 2-Sand Storm VGA

GQ0160 1-Stelcon 2469 Stellar Conquest the ultimate space strategy/war game! 2-Dr. Rudy arcade/action Block-Out type game

GQ0170 1-Clyde's Adventure on his quest for lost treasure through 16 deadly castles 2-Lavacap exciting arcade strategy game

GQ0181 (2 disks) Megatron VGA real-time 2 player strategy game (1or2 computers) find & destroy your adversary before he does.

GQ0191 (2 disks) GateWorld Volume 1 arcade adventure game with story and epilogue sequences. 2 Mega graphics, Ad Lib

GQ0200 1-Space Blaster adventure game 2-Clyde's Adventure in search for treasure through deadly castles Req EGA/VGA, 286+

GQ0210 Corncob 3D air combat VGA+ game, check your altitude gauge, then steel yourself for another run at enemy. Req 80286

GQ0220 1-PC Pool 2-3DPool 3- 2Player Volleyball 4-Archery 5-Bowling 6-Tennis

GQ0230 1-Robomaze II arcade action game 2-Dragcity USA truck racing game 3-Tapper arcade game 4-Bouncez pong type

GQ0240 Risky Woods arcade action game excellent, detailed pictures. Fight monsters.

GQ0250 1-CD-Man Eats the dots while avoiding the nasties 2-Mario VGA arcade game 3-MineLayer colorful arcade game

GQ0260 1-Battleship VGA game, mouse interface, lay mines 2-Space Blaster VGA space adventure 3-Life EGA/VGA game

GQ0270 Astro Chicken VGA arcade game

GQ0281 The Lost Vikings VGA/SVGA arcade action game, get the 3 Viking dudes through the levels. This is team work! game

GQ0290 Baron Baldric exciting, hilarious arcade game with most outrageous characters. Help the Baron recover his family treasures .

GQ0301 (3 disks) Oxyd game of exploring and discovery introduces friction, velocity, gravity, electricity, magnetism, lasers & more.

GQ0310 1-Scorched Earth VGA artillery game for up to 10 players 2-Miramar fully operational Jet combat simulator.

GQ0320 JetPack arcade action VGA game 100 levels of treacherous dungeons. S Blaster

GQ0331 Adventures of Maddog Williams interactive VGA animated adventure game.

GQ0340 1-JumpJet: Fly your jet &destroy enemy aircraft/targets 2-Moraff's Pinball for EGA/VGA 3-Chopper Commando

GQ0350 1-LHX attack chopper in exciting desert attack mission. CGA EGA VGA 2-Nova Strike space flight simulation combat game. Req. 286+, VGA and mouse.

GQ0360 1-Ninja arcade martial art game 2-Avoid the Noid arcade game 3-Alive Sharks

GQ0370 1-Lamers arcade game 2-VGA Trek arcade to hit enemy ship before it cloaks.

GQ0380 1-Crusher VGA adventure arcade strategy game 2-Turoid VGA ball-paddle type game 3-Space Legion Academy training

GQ0391 (2 disks) 1-Lollipop arcade VGA game Req ext/exp memory 2-Mustang fight an array of evil enemy 3-Line Wars 3D space war game uses modem or direct link.

GQ0400 1-BipBop II incredible 3D VGA digitized animation arcade game 2-Balloonz fly thru deadly star fields, destroy enemy ship

GQ0410 1-Pinball Dreams VGA with 4 different pinball tables, ignition, steel wheel, beat box, realistic ball movement & tilt, adlib/sblaster/roland 2-Dr. Mario arcade game

GQ0421 (2 disks) Billy The Kid- 3D VGA western action arcade game; Req VGA, 286-16, 530kb 2-Bounce Zone a 3D pong pong

Sport/Recreational Games

GR0010 1-Bass Tour fishing game the ULTIMATE fishing game. Fish a 3 day tournament in a fully rigged bass boat. 2-BassMap for Bass Tour

GR0020 1-The Sports Trivia Desktop Calendar will each day bring you a new page of sports trivia 2-Miniature Golf game 3-3D pool game with a standard rack of 15 numbered balls and a cue ball

Strategy/Text Games

GT0010 World Empire strategy game

GT0020 Hugo II, WhoDunIt? superbly animated 3-D EGA murder mystery game with a couple of fiendish twists and humor

GT0030 1-Notrus game to strategically place the falling blocks 2-Solitile solitaire

GT0040 1-Mahjong VGA Req. 640kb, mouse 2-Pirada blackjack solitaire game

GT0050 1-Jeopardy 2-Wheel of fortune

GT0060 1-Crossword puzzles set 1 and set 2 2-Wordlok makes crossword puzzles from its internal list of words

GT0070 1-Hollywood Trivia 2-Cross Of Insanity 3-Mahjongg solitaire game

GT0080 1-Moraff's Morejongg VGA SVGA Mahjongg 2-Atomic Tetris two player Tetris game 3-Bananoid breakout-style game

GT0090 1-Bones text-game of suspense 2-Dnd fantasy role playing game 3-MazeWars 4-OilWell game of strategy & luck 5-Othello board game 6-Quatrix 3D Tetris game

GT0100 1-Hunt For Red October action-strategy game 2-Frigate strategy game to destroy Soviet ships 3-Gemini tank

GT0110 1-Beyond Columns Tetris-type game 2-EZ Slider to re-arrange squares 3-Frac 3D Tetris-type game 4-Idiot's Delight solitaire

GT0120 1-LadderMan fun-filled game of logic, planning & problem solving 2-Isle Wars to conquer islands Req EGA/VGA

GT0130 1-Scorched Earth artillery combat game 2-Sherlock game of solving puzzles

GT0151 (2 disks) 1-Hexxagon animated strategy game, 1meg VGA graphics, digital sound 2-Idiot's Delight solitaire 3-Pac-Man

GT0160 Tornado combat flight simulation with high speed & firepower on realistic 3D European terrain. Req 386, VGA, mouse

GT0171 VGA Planets is a graphical multi-player play-by-turn space combat game for one computer, BBS or Network. Req VGA & HD

GT0180 1-3D Trek - stop ship's destruct sequence 2-Ground War two-player (Allies vs. Iraqis) tank war; Req VGA 3-Oil Cap arcade

Hard/Floppy Disks

HD0010 1-CopyQm disk duplicating software 2-TeleDisk the diskette fax machine

HD0020 1-DiskTrak keep track of files on disks 2-FFit copies group of files to fill a disk

HD0030 1-Disk Organizer 2-Format in background 3-Disk-at-a-Glance 4-FastCopy 5-HD Info 6-NewChk 3D

HD0040 1-Disk Copy Fast 2-SmartDrive replacement with more conservative disk caching 3-NFormat formats 1.44M to 1.7M & 1.2M to 1.5M 4-Boot2C ignores A: drive disk

HD0050 1-FormatMaster fast floppy disk formatter 2-Initiates low-level format of IDE drives 3-Find HD Type 4-low level format IDEs 5-Setup utility 6-DiskMeter benchmark 7-Relocate IDE 8-Identify IDE

Health and Diet

HF0010 1-The Better Diet Analyzer to improve your performance or lose weight 2-The Professional Analyst reveals your psyche

HF0020 1-The Grocer simplifies grocery shopping. Easily create & update grocery list 2-Personal Recipe CookBook (recipe file management) with 3x5 & 4x6 recipe cards

HF0030 1-NSL Diet Analyzer Keeps track of your eating habits 2-Doctor (Internist) a Doctor-on-disk program

HF0040 CompuChef cookbook / nutrition guide with over 100 traditional American recipes. Create and store up to 2200 of your own recipes. Easy recipe storage, and retrieval

HF0050 Your Birthday Almanac makes a commercial quality print of: What happened the day you were born? A treasure of info about your birthday. Req laser printer/Deskjet

HF0060 1-Doctor On Disk - keep a close check on many symptoms/illnesses 2-Palm Reader shows palm lines/their meaning CGA+

HF0070 Meal-Master Recipe File System lets you type a meal name and see how to make it. Type one ingredient and you will see all the foods that can be made with it. Shows all the meals for any food category

HF0080 1-AeroChart aerobic exercise log book/graphing program 2-Nutrition Analyst: creates a diet plan that meets nutritional needs

HF0090 1-Noach genealogy program prints family-trees 2-Personality Analysis

HF0100 1-Ez-Tree Genealogy prints ancestral, descendant charts 2-Me & My Metabolism examines basal metabolic rate.

Music/Sound Library

MS0011 (2 disks) WAV sound files for Microsoft Windows 3.1 from various sources

MS0020 Bach organ music for AdLib is a library of 58 Dover Publications music files

MS0030 1-Note by Note plays notes from your sound card or PC speaker 2-Airwolf Theme 3-Scream Tracker Module Player

MS0040 1-Whoop It maximizes Windows sound capabilities 2-Collection of MIDI files

MS0050 1-Voice Blaster Jr. for Windows plays midi and voc files 2-Sound Blaster Pro drivers for Windows 3.1 3-Tapi for SBlaster

MS0060 1-FM driver for Windows 2-Sounds from Star Trek 3-SBlaster drivers for Windows 3.1 4-Xmas songs for AdLib

MS0070 1-Surf WAV audio toolbox 2-CD-Box plays music files on AdLib and SoundBlaster in 256 colors with animation 3-Replay plays 8bit digital audio on PC speaker

MS0080 Mod music files: 1- 12War 2-Bass 3-Feeling Funky

MS0091 1-WAV sounds from "Star Trek II: The Wrath of Kahn" 2-WAV Sound from "Star Trek IV: Return to Earth"

MS0100 1-Spanish sounds & numbers 2-Parrot VoiceKit voice files 3-convert MOD files to STM 4-convert CMF to MIDI 5-Dual Module Player loads modules into EMS

MS0110 Drum Blaster from Epic Mega games provides room-shaking sound effects and music for your whole family Req SBlaster

Assembly Programming

PA0010 609 kbytes of ASM source codes

PA0020 collection ASM source codes for hardware/software access for the novice

PA0030 1-CoreAids 2-Chips 3-ExecBeep 4-Dos31 5-FigForth

PA0040 1-Files2-Assembler3-Forth 4-Hack24

PA0050 1-Show 2-Res863 3-Pm286 4-PrtScFX 5-Modem7 6-SDir 7-Screen 8-RomBios 9-Printer 10-ShellAsm 11-SDF 12-SavRst 13-LpMac 14-Search

PA0060 1-Toggle Clock 2-DvIntShr 3-Interrupt 24 Handler 4-Pass word protect your system. 5-OptASM fully functional demo 6-Sniper 7-StepRate

PA0070 1-Assembly language tutor 2-Assembly Wizard 3-BatchMan 4-Dis86 full screen disassembler 5-Screen code-generator

PA0080 1-Release 2-Send 3-View 4-Nansi 5-LS 6-FM 7-Fmacs 8-DU 9-DPU 10-DF 11-CtrlAlt

PA0090 1-Apple][emulator for 286/386 2-Copy ROM to RAM 3-PCTrace adds an internal trace table to DOS 4-Increase pc speed

PA0100 A86 Macro Assembler/Debugger

1Q: Basic Language

PB0010 Full Source code for 29 Games

PB0020 1-Advanced Function Library 2-Arrays in basic 3-ProWindows Lite 4-Pull down menu 5-VGA Horse Racing

PB0030 1-Financial calculator 2-Solar data 3-Mini-Minder rental property manager

PB0040 CPA-Ledger automated ledger & financial statement system (Full Basic src)

PB0050 1-ApBasic Compiler very good share ware version of QBasic 2-Basic to QBasic 3-Resume helps you prepare a resume

PB0060 1-Data Entry 2-B17 game 3-Data entry screens 4-Make Basic pgms more readable 5-Picture of Beetles 6-Measure IQ

PB0070 PDS*Base multi-file automatic relational data base system

PB0080 1-QB compiler/linker assistant 2-Quick Banker 3-QB Hashing 4-QB dBASE III files 5-LANtastic support 6-line editor 7-QB serial communications 8-Weather Forecaster

PB0090 The BASIC Wizard's Library

C & C++ Language

PC0010 1-Assync Class 2-C Tool Box 3-Cipher 4-Flash Pac C library

PC0020 1-Assync communications tools 2-Jaz C Library source code for 193 routines

PC0030 1-RS232 Interrupts 2-Extended C library 3-Graphics interface 4-Tools for C

PC0040 1-LiteComm communications toolbox 2-UNIX like commands for DOS

PC0050 1-PCGraphics 2-Steve's Turbo C Library

PC0060 1-Brace check 2-C-Adventure games 3-Lessons in C 4-YACC a C compiler

PC0070 1-C database 2-Do 3-Hide files 4-Parser routines

PC0080 1- C++ Tutor 2-C Rules

PC0090 1-C Tutor 2-Concurrent multi-tasker 3-C declarations

PC0100 DialogPro helps implement user interface 'Dialog Box'

PC0110 1-CRobots 2-41 C windowing routines 3-89 video text routines 4-PullDown

PC0120 1-Personal C Compiler 2-Indent makes C sources more readable 3-Printing utility 4-Wild card routines

PC0130 1-C window/screen manager 2-CXL library supplement (PC0141) 3-TC Windows 4-Tess TSR library 5-Window lib.

PC0141 (2 disks) CXL The C Programmer's Extended Function Library

PC0151 (2 disks) WindowPro screen control libraries

PC0161 (2 disks) The Window BOSS C functions to create & manage text windows

PC0170 1-Qwikc Screen Utilities 2-Screen design utility library functions

PC0180 1-CDraw 2-Colors 3-Human Interface Manager

PC0190 1-Panels for C screen I/O 2-WindowC: high speed window library

PC0200 C-Library from folks at Jet Propulsion Laboratory

PC0210 Over 75 utilities and functions in this package that will improve program development in C

PC0220 1-Touch 2-Timer 3-Tess TSR library 4-Subs 5-Spies 6-Sizer 7-Upper 8-ZFormat 9-Xmodem 10-VDisk

PC0230 1-Wrlmage word game 2-New Clock for kids 3-MComm asynchronous functions for C

PC0240 1-GIF Library 2-GIF-TIF 3-Generate Hex code

PC0250 1-Convert Pascal to C 2-Library for virtual arrays 3-The Warp Graphics library

PC0260 1-C++ Tour 2-CTV-MOD tools for Creative Voice System applications

PC0270 C Tutorial with lots of examples

PC0280 1-Unix utilities 2-WinTool 3-Timer interrupt de-install routine

PC0290 Omega the complex rogue-style game of dungeon exploration. Search the caves to find them (Over 900Kb C Source)

PC0300 1-DB (DataBase) package 2-DR. FeelGood Dr. Mario-type game 3-Dump Graphics 4-Puzzler picture puzzle game

PC0310 1-Go 2-Info 3-ISAM 4-ROM 5-TIF to GIF

PC0320 1-Routines for .PAC/.ARC files 2-See PCX header 3-VGA Kit 4-View Icon

PC0330 1-Optimizing C compiler for the Motorola 68000 2-Bball 3D Beach Ball 3-BCalc high precision RPN Calculator 4-BNSLIB Object Module Library Manager

PC0330 1-CSAP: sort & pack directories 2-C Window Toolkit 3-Dhrystone Benchmark 4-Fast Video Interface Routines

PC0340 1- B-Plus BTree indexing file module 2-cScreen Editor Complete Screen Editor 3-CPR C Source Code Formatter 4-Cracker Multiple Pass Disassembler

PC0360 1-Graphics Primitivee Library 2-Heap Sort 3-Indent Pretty-Printer for C code 4-Graphic routines for MS C 5-Mad SZ

PC0370 1-Make Object 2-Random Maze Generator 3-Modify Norton Guides 4-NJFind File Find Utility 5-Debug Techniques For C

PC0380 1-C to dBase routines 2-Date Handling routines 3-Generates flow chart of c source files 4-The ClipStac API routines

PC0390 1-Check for Desqview 2-Door Developer kit 3-Unzip files 4-Pointers in C

PC0400 1-Digitized Voice Programmer's Toolkit create and play digitized voice recordings 2-ViewFont on-screen font viewer

PC0410 1-MS C callable bios routines 2-Toolbox for serial communications 3-C examples 4-C coding guidelines 5-Execute a command line 6-Show animated pictures

PC0420 1-FN32 provides 32 character filenames under DOS 2-Interrupt 24 handler 3-Mouse interface routine 4-C library for reading/writing PCX files

Misc. Programming

PM0012 (2 disks) Text, Adventure Game Toolkit - powerful, professional & easy to use.

PM0020 1-Seagate hard disks specs 2-info on AMI bios 3-Interrupt calls 4-Low memory 5-Intel Opcodes 6-Pin Assignments

PM0030 BC-Fortran77 compiler, linker, module library & debugger. Req 640kB RAM.

Pascal Language

PP0010 1-BGI peek 2-C routines in pascal 3-Change file atrib. 4-Comm interface 5-C to Pascal conversion utility

PP0020 1&2-Error handling 3-data entry in pascal 4-Get Declarations 5-Heap check 6-Turbo Btree and dBase program

PP0030 1-Findfile 2-Getfile 3-TP enhance 4-Joy stick 5-Key View 6-Linked Lists

PP0040 1-Comm toolbox 2-TSR program 3-Move text blocks 4-Life game 5-Pretty printer 6-Pass functions as argument 7-Pull down menu system

PP0050 1-File pick, popup 2-TSR Help 3-TP Info 4-Timers 5-3D objects 6-Mouse 7-TP Stack 8-RomCopy

PP0060 1-Trace programs 2-Window 3-View disk Tree 4-Tree traverser 5-IO & date functions 6-Show interrupts 7-Code analyzer

PP0070 1-Command line arguments 2-Asm to inline 3-Comm call 4-Dir 5-Fast write 6-GetDir 7-Paths 8-Music 9-String library 10-Graphics 11-Multi file search/replace

PP0080 1-Piano 2-Amazing screens 3-Colored string 4-Keydemo 5-Animated screens 6-OkiGrafx 7-Flexible disk labeler

PP0090 1-Date Link 2-Complex numbr 3-Rotate 2Ds 4-Object mouse 5-Better Crt unit 6-Palcic dir routines 7-Links 8-Objects unit

PP0110 1-TP&ASM Integrated Compile-Time Assembler 2-Data Entry Matrix 3-Scroll

PP0120 1-Gantt Charting program 2-Infer 3-WinPascal compiler for Windows 3.xx

PP0130 (Pascal) Software Tools for IBM

PP0140 P-Robots game. Battle robots in a fight with flying missiles, shields, cloaks, and bombs. Includes new IDE (Pascal src)

Windows Applications

WA0010 1-Alfred desktop butler 2-Slough puts sharp looking screen shots in your reports

WA0020 1-Windows UnZip 2-PC Labs Window benchmark 3-Talking Terminator!

WA0030 1-Metz Desktop Manager 2-ToWav converts files to sound files 3-BizWiz Financial Calculator 4-CPU usage meter

WA0030 1-WinTach benchmark program from TI 2-Wave Player plays WAV files & launches programs 3-Guitar Scales & Modes 4-Winchime tells the time using human speech

WA0040 1-ClockMan scheduler/reminder 2-FileMan file manager 3-Foreign characters 4-FreeMem displays free system resources

WA0050 1-Explosive - 16 DOS/Windows screen savers 2-PaperBoy random wall papers

WA0060 1-Explosiv Logo DOS/Windows screen saver uses Gif 2-FrontWindow file mgr

WA0070 1-Multi-Label labeling program 2-Fish screen saver 3-Dupe deletes duplicates

WA0080 1-MicroWerks communications application program 2-Lister text file printer

WA0090 1-Super Task Man - replacement Task Manager for Windows 3.1 2-IconMaster icon manager/editor 3-New Eyes watches you

WA0101 Softerm Plus communications appl, terminal emulation, script, file transfer.

WA0110 1-UniCom communications appl with many features 2-IQTest 3-WinOutline

WA0120 1-Zip Manager for PkZip, Arc, LHarc 2-WinClock 3-Tynee calculator 4-WorldTime 5-SysUse 6-SuperLoad at startup

WA0130 1-Screen Peace screen saver 2-Background Menu 3-Icon Frightener 4-Lister

WA0140 1-NewPaper selects random wall papers at startup 2-WinTide a linear tide clock

WA0150 Rockford! lets you design and print professional looking business cards

WA0160 1-Fonter displays/lists Windows fonts 2-FontView displays soft font characters 3-FontClean cleans up shareware fonts

WA0170 1-FontTabl prints info about any printer font 2-FntPrn displays & prints a font catalog 3-FontLoader scale/angle/mirror fonts

WA0180 1-Showgif image viewer/catalog manager 2-WinIpeg image viewer/enhancer

WA0190 1-Winvelope utility for printing envelopes 2-BitFax fax software 3-Whiskers assigns functions to keys and mouse buttons 4-WinRoach hides under windows

WA0200 1-Arc Master compressed-files manager 2-Folders create/manage file folders

WA0210 Astronomy Lab - create animated astronomical events, astronomy reports/graphs

WA0230 1-A Project/Event Planner for quick project planning & activity scheduling 2-Art Show for .BMPs 3-BizWiz calculator

WA0240 1-CRT adjustment tools 2-Joy stick driver 4-Replace cursor with animals, people 5&6-Font Viewers & font information

WA0250 Windows 3.1 hi-res 256 color display VGA/SVGA drivers form Microsoft

WA0260 1-FormCode/Gen- Design forms & mailing labels & print from dBase programs 2-PowerBar/Write adds power to Windows Write 3-PrintEnvelope with graphic images

WA0270 1-SecureGroup protects program manager groups with passwords and restricts program manager functions 2-Seascape screen saver 3-Win Outline outline editor

WA0290 1-Case Liner for audio cassettes 2-DiskMan prints professional labels; catalogs disks 3-SideBarLite desktop organizer

WA0300 1-TrashMan puts directory/files in a trash can till you decide to restore, delete them!; attach sounds 2 events 2-Talking clock

WA0320 SoundWAV lets you assign files to sounds, play the sounds; select sounds files randomly or sequentially with no overhead!

WA0330 1-Fingers N Toes calculator, run macros, find mortgages payments 2-WAVawa to play/edit sounds files 3-Wave Player can launch programs; restart Windows , and more

WA0340 1-WinClean removes Windows application programs 2-Zipman shell for PkZip Lzh, Arj, and Arc. Req 386SX, VGA+ 3-NoNag for screens that ask to press a button

WA0350 1-Achievement Planner calendar, appointment,day/project planner, contact mgr. 2-Torque does bitmap performnce 3-WavEdit

WA0361 (9 disks) Painless Accounting for Windows; general ledger, accounts receivable, accounts payable, any businesse

WA0371 (3 disks) Wall $treet the Bottom Line for Windows; for stocks, bonds prec. metals, etc. a must for investor/CPA.

WA0381 (2 disks) 1-Gradebook for Windows for professional educatr 2-Fontoff font mgr 3-InControl install/remove softwrs

Windows Fonts

WF0010 Soft font collection 1-Americana 2-AMfont 3-Basque

WF0020 1-Aarcover 2-Agate 3-Agate-bold 3-Agate-italic 5-Alex-fraction-normal

WF0030 1-American Typewriter-Light 2-Andromeda 3-American-Uncial 4-Architect 5-ArchitextOneType

WF0040 1-Ariston-Italic 2-Ballet Engraved 3-Baskerville Normal, Italic & Bold

WF0050 1-Becker-Medium 2-Bedrock-Light 3-BenjaminCaps 4-Beffle 5-BellBottom

WF0060 1-Blippo-Heavy 2-Bodacious 3-Bodoni Normal, Bold & Italic

WF0070 1-Brush-Script-Italic 2-Caligula 3-CarrickCaps 4-BlackChancery 5-RSCanaith

WF0080 1-Cascade-Light 2-Cavemann 3-CenturySchoolbook Bold, Italic &BoldItalic

WF0090 1-ChiliPepper-ExtraBold 2-Civitype 3-Cloister-Black-Light 4-Cooper-Heavy 5-Coronet-SemiBold-Italic

WF0100 1-CracklingFire 2-CSD Block-Bold & Jersey-Normal 3-Cunei Form & Light

WF0110 1-CracklingFire 2-DavyDingbats

WF0120 1-Igloo Laser 2-Lemiesz 3-Salter 4-Saloon 5-RockMaker

WF0130 ATM PostScript Font Pakage: 1-Machine 2-BGraphicLight 3-Howard Light & Fat-Light 4-GriffinDingbats

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WF0160 ATM PostScript Fonts Package: 1-Eastside 2-Westside 3-Andromeda 4-Faustus 5-CharlieChan 6-Albatros

WF0170 True Type Fonts: 1-Liberty Hollow 2-Extended Hollow 3-Alfredo Heavy Hollow 4-Cartoon Hollow 5-Cimier Hollow 6-Circle Black Hollow 7-Flick Bold Hollow 8-Tubular Hollow 9-Vagabond Hollow

Windows Games

WG0010 1-BlackJack 2-Battle Grid like the classic Battleship game 3-Yachtzee

WG0020 1-Blackout 2-Blitzer Helicopter

WG0030 1- Star Trek 2-Hearts card game

WG0040 1-Cannonball 2-Chomp 3-Tetris

WG0050 1-Card Game 2-Towers 3-Mines

WG0060 1-GNU Chess 2-Herma maze game 3-WormWar

WG0070 1-Taipei 2-Yachtzee 3-Black Jack

WG0080 1-Win Jack 2-Win Trek

WG0090 1-Backgammon 2-EG space war game 3-Slot machine

WG0110 1-Box World with 100 difficult levels 2-Pipes - lay pipes to keep the liquid flowing 3-Checkers game for windows

WG0120 1-Roulette 2-WinPoker video poker game 3-Bang!cannon-fire 4-Neko kitty

WG0130 1-Jewel Thief! 2-Blackout 3-WinFight gun fight game 4-Puzzles

WG0140 1- 4Play is a 4x4 grid tic-tac-toe 2-Cribbage card game 3-Hyperoid shooting

WG0150 1-Warheads stop enemy missiles before they reach cities 2-Lander real-time simulated lunar landing 3-Magic Domino

WG0160 1-Missile Master action/arcade game; digitized sound effects. 2-WinChess

WG0170 1-Atlantic City Blackjack lets you develop and test new Blackjack strategies 2-Cell War game 3-Ms. Chomp arcade game 4-Simone based on the old game "Simon Says"

WG0180 1-Jpuzzle scrambles BMP files into 4 to 1225 pieces. Jigsaw/sliding play modes Req 1mb VGA 2-Calculation Solitaire

Windows Graphics

WP0010 1- 3D icons 2-Ant Farm animated background 3-Awesome collection of icons 4-Icons for DOS applications

WP0020 ColorView image viewer and enhancer (both 8088 and 80386 versions)

WP0030 1-Fractal generator 2-Convert GIF to icons 3-Convert icon to BMP 4-IconDLL builds a library of the existing icons

WP0040 1-BBView image converter and viewer 2&3-Collection of BMP files 4-Grabit captures portions of the screen that you need

WP0050 Graphic Workshop - view, print, convert, color, and enhance bitmapped images

WP0071 (2 disks) 1-PixFolio maintains & prints catalog of images 2-Icondraw icon editor 3-WinGIF image viewer/enhancer

WP0080 VuImage displays, scales and prints GIF and bi-level/gray scale TIFF files

WP0091 (2 disks) Paint Shop Pro a Windows program that will display, scan, alter, print, convert images; capture screen

WP0101 (2 disks) Collection of 1500 icons for Windows and DOS applications

WP0110 1-CAD Vantage CAD program for Windows 3.1 2-Professional Capture Systems screen capturing program for DOS & Windows 3-WallMac Macintosh wallpaper

WP0120 1-Screen Thief captures screen in GIF, PCX, TIF, BMP formats 2-WinPak#1 with 8 Windows 3.1 animated screen savers.

WP0130 1-Icon Manager complete set of tools to create, modify, extract, and organize Windows icons 2-Fractal creator and editor

WP0140 1-Fractal Frenzy screen savers display 256color VGA animated fractal scenes 2-IconWorks full featured icon editor. Req. VBRun300.dll 3-EyeCon watches the cursor

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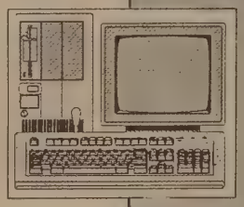

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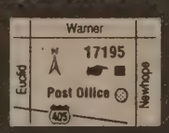

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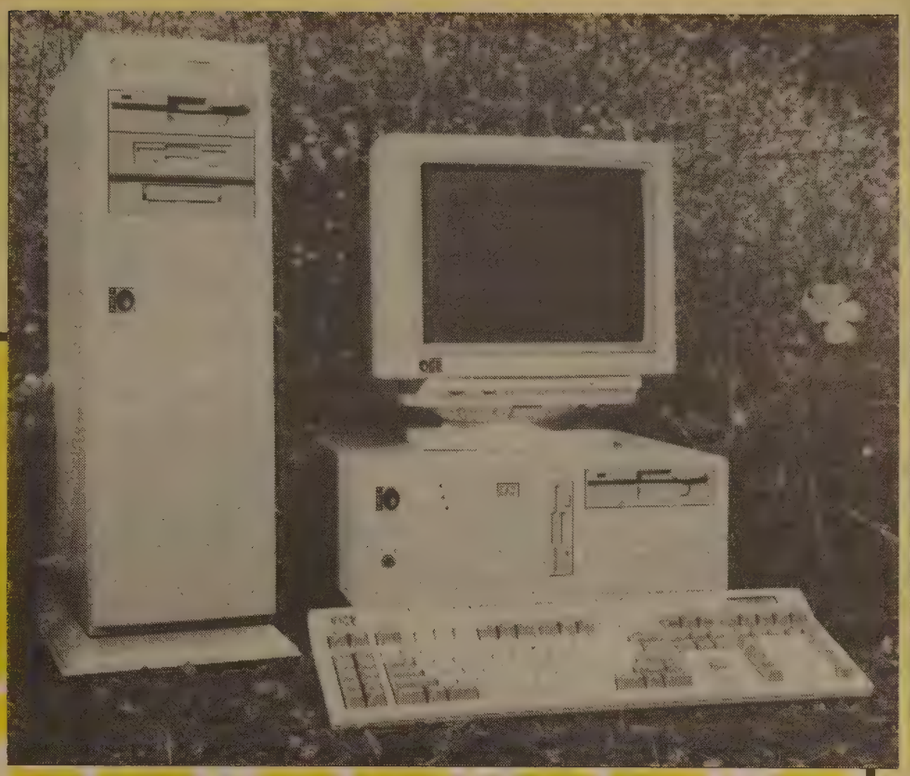

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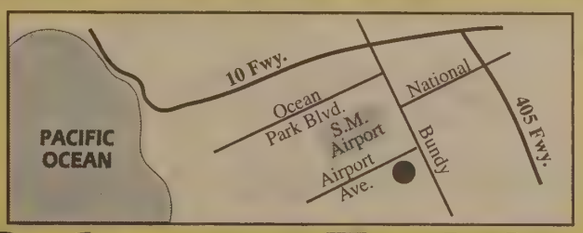

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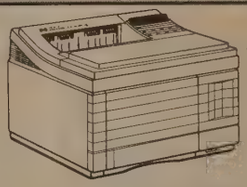

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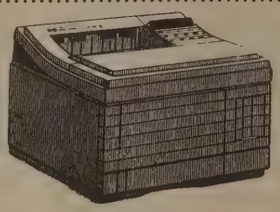

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486 CPU Fan	ADD $12
Install 2400 Baud Modem	ADD $28
Install 96/24 Fax Modem	ADD $45
Install 96/14.4 Fax Modem	ADD $145
Install Colorado Backup 120	ADD $149
Install Colorado Backup 250	ADD $189
Install Additional RAM 1MB	ADD $59

TOTAL YOUR SYSTEM

By Adding Parts 1-3

And Any Other Add's On This Page

PART ONE_____
PART TWO_____
PART THREE_____
OTHER_____
OTHER_____
OTHER_____
OTHER_____
TOTAL:_____

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* Intel 80486DX Processor
* Pentium Overdrive ready
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* HEAT-SINK w/FAN for 50Mhz/66MHz System
* 256K Cache Memory
* 4MB RAM installed (Exp. to 128MB)
* Middle Tower case w/200W UL power supply
* 1.2MB & 1.44MB TEAC Floppy Drives
* 251MB Connor IDE Hard Drive 12ms
* IDE Floppy/Hard Drive controller card
* 2 Serial, 1 Parallel, 1 Game Port
* VESA Local Bus SVGA Graphics accelerator card w/1MB. Resolution up to 1280x1024. 72Hz refresh rate. 16.7 mil. colors.
* 14" VESA standard NON-INTERLACED Super VGA color Monitor. 72Hz at 1024x768. .28 dot pitch. Maximum res. 1280x1024.
* Keytronics (USA) 101-Key Keyboard
* Hi-Resolution Mouse

DC486DX-33EV 251MB HDD	$1575
DC486DX-50EV 251MB HDD	$1725
DC486DX2-66EV 251MB HDD	$1805

DC 486DX-33 & 66MHz VESA NI Monitor & VESA Local Bus System

* Intel 80486DX Processor
* Pentium Overdrive ready
* 3 VESA COMPLIANT LOCAL BUS Slots
* HEAT-SINK w/FAN for 50Mhz/66MHz System
* 256K Cache Memory
* 4MB RAM installed (Exp. to 128MB)
* Mini-Tower case w/200W UL power supply
* 1.2MB & 1.44MB TEAC Floppy Drives
* 170 MB Quantum IDE Hard Drive 14ms
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* 2 Serial, 1 Parallel, 1 Game Port
* VESA Local Bus SVGA Graphics accelerator card w/1MB. Resolution up to 1280x1024. 72Hz refresh rate. 16.7 mil. colors.
* 14" VESA standard NON-INTERLACED Super VGA color Monitor. 72Hz at 1024x768. .28 dot pitch. Maximum res. 1280x1024.
* 101-Key Keyboard
* Hi-Resolution Mouse

DC486DX-33V 170MB HDD	$1275
DC486DX-50V 170MB HDD	$1425
DC486DX2-66V 170MB HDD	$1505

IBM 486SLC/2-66MHz VESA NI Monitor & VESA Local Bus System

* IBM 486SLC/2-66MHz Processor
* Cyrix math coprocessor
* 3 VESA COMPLIANT LOCAL BUS Slots
* HEAT-SINK w/FAN for 66MHz system
* 256K Cache Memory
* 4MB RAM installed (Exp. to 32MB)
* Mini-Tower case w/200W UL power supply
* 1.2MB & 1.44MB TEAC Floppy Drives
* 170MB IBM IDE Hard Drive 15ms
* IDE Floppy/Hard Dirve controller card
* 2 Serial, 1 Parallel, 1 Game Port
* VESA Local Bus SVGA Graphics accelerator card w/1MB. Resolution up to 1280x1024. 72Hz refresh rate. 16.7 mil. colors.
* 14" VESA standard NON-INTERLACED Super VGA color Monitor. 72Hz at 1024x768. .28 dot pitch. Maximum res. 1280x1024.
* 101-Key Keyboard
* Hi-Resolution Mouse
* 100% IBM OS/2 2.1 compatible
* Award BIOS

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IBM OS/2 2.1 Add $99

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★★★ Upgrade Options for VL-Bus Systems ★★★

EISA-VLB System Upgrades
Add prices to the above configuration

* Orchid Fahrenheit VL-Bus	$ 70
* Orchid Celsius w/1MB VL-Bus	$155
* Diamond Viper w/2MB VL-Bus	$295
* 15" SVGA Flat Screen Monitor	$140
* 17" SVGA Flat Screen (.26dot)	$440
* VL-Bus IDE cache ctrl. w/2MB	$215
* VL-Bus SCSI controller card	$145
* Adaptec AHA-2742T EISA SCSI	$375
* 340MB 11ms IDE Hard Drive	$ 80
* 340MB 12ms SCSI Hard Drive	$140
* 425MB 12ms IDE Hard Drive	$205
* 545MB 12ms IDE Hard Drive	$355
* Full-tower case w/230UL p/s	$ 25
* Pearl tower case w/300UL p/s	$ 75

VL-Bus System Upgrades
Add prices to the above configuration

* Orchid Fahrenheit VL-Bus	$ 70
* Orchid Celsius w/1MB VL-Bus	$155
* Diamond Viper w/2MB VL-Bus	$295
* 15" SVGA Flat Screen Monitor	$140
* 17" SVGA Flat Screen (.26 dot)	$440
* VL-Bus IDE controller w/IO	$ 25
* VL-Bus IDE cache ctrl. w/2MB	$240
* VL-Bus SCSI controller card	$175
* 251MB 12ms IDE Hard Drive	$ 40
* 340MB 11ms IDE Hard Drive	$120
* 425MB 12ms IDE Hard Drive	$245
* 545MB 12ms IDE Hard Drive	$395
* Mid-tower case w/230UL p/s	$ 25
* Full-tower case w/230UL p/s	$ 50

IBM VL-Bus System Upgrades
Add prices to the above configuration

* Logitech Mouseman (serial)	$ 35
* Microsoft mouse 2.0 (serial)	$ 35
* Orchid Fahrenheit VL-Bus	$ 80
* Orchid Celsius w/1MB VL-Bus	$155
* 15" Color Flat Screen Monitor	$140
* 17" SVGA Flat Screen (.26 dot)	$440
* VL-Bus IDE controller w/IO	$ 25
* VL-Bus IDE cache ctrl. w/2MB	$240
* 251MB 12ms IDE Hard Drive	$ 40
* 340MB 12ms IDE Hard Drive	$120
* 425MB 12ms IDE Hard Drive	$245
* Mid-tower case w/230UL p/s	$ 25
* Full-tower case w/230UL p/s	$ 50
* Pearl tower case w/300UL p/s	$100

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☞ see next page

VESA Local Bus Color Notebook

Active Color, Passive color, Mono VL-Bus Notebook

* Intel 486SX/25, 486DX/33, 486DX2/66 Processor
* Built-in CPU fan
* 4MB RAM installed (Exp. to 20MB)
* VESA Local Bus IDE HD/FD controller card
* VESA Local Bus VGA graphics accelerator card
  1024 x 768 SVGA Output to External Monitor
* 10" Mono Backlit VGA LCD display, 64 gray scale
* Screen upgradable to Color LCD
* 3.5" 1.44MB Floppy Drive
* 120MB IDE Hard Drive (245MB option)
* 1 Serial, 1 Parallel port
* 2 x TYPE II and 1 x TYPE III PCMCIA slot
  (Fax/modem, hard disk drive, LAN adapter)
* Built-in trackball mouse
* AT BUS I/O (152Pins) for Docking Station
* Weight 6 lbs. with battery
* External AC adapter
* Carrying case
* External Keyboard port with AT adapter
* External VGA port
* One year parts and labor warranty

	Mono	Passive color	Active color
486SX-25 4MB/120MB	$1775	$2375	$3375
486DX-33 4MB/120MB	$1945	$2545	$3545
486DX2-66 4MB/120MB	$2145	$2745	$3745

Upgrades for VL-Bus Notebook

245MB HDD upgrade from 120MB	$260
Extra Battery	$105
Auto Cigarette Adapter	$ 85
External AC Adapter	$105
96/24 Pocket Fax/Modem	$ 99
14.4/14.4 Pocket Fax/Modem	$245
PCMCIA 96/24 Fax/Modem	$245
Docking Station for VL-Bus Notebook	$525

SBPro Multimedia Kit $365

* **Sound Blaster Pro**
  1) Stereo 20 voice, 4-operator OPL3 FM music synthesizer
  2) Stereo DAC's and ADC's - 8bit
  3) Stereo Digital/Analog mixer
* **Panasonic CD-ROM**
  1) 630MB data capacity
  2) 64K buffer memory
  3) 390ms access time: exceeds current MPC standard
  4) Full Interface compatibility with SB Pro Audio card
* **Bundled Software - 5 CD Titles**
  1) Software Toolworks Multimedia Encyclopedia
  2) King's Quest V
  3) Mixed-up Mother Goose
  4) Software Toolworks U.S. Atlas
  5) Software Toolworks World Atlas

Windows 3.1 & MPC Compatible

SB 16 Multimedia Kit $485

* **Sound Blaster 16**
  1) 16 bit stereo playback and recording
  2) Stereo 20 voice, 4-operator OPL3 FM music synthesizer
  3) Microphone Automatic Gain Control (AGC) Amplifier
* **Panasonic CR-562 Double speed CD-ROM**
  1) 540MB data capacity
  2) 300KB/sec (double speed) transfer rate
  3) 320ms access time: exceeds current MPC standard
* **Bundled Software - 7 CD Titles**
  1) Software Toolworks Multimedia Encyclopedia
  2) King's Quest V
  3) Mixed-up Mother Goose
  4) Software Toolworks U.S. Atlas
  5) Software Toolworks World Atlas
  6) Tempra Photo CD
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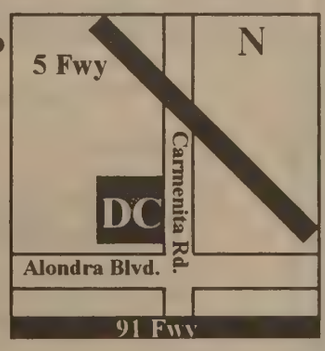

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TEAC 1.44MB Floppy Disk
VLB 32 Bit Video Accelerator w/1M
32 Bit FDD/HDD IDE Controller
Medium Tower Case 230W Power
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Hi Resolution Mouse & Mouse Pad

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Upgrade Options: Add Below Price	
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SVGA 15" .28 NI Flat	*$135*
SVGA 17" .28 NI VESA	*$495*
340MB Hard Disk Drive	*$85*
540MB Hard Disk Drive	*$340*

Best Quality!

CP VESA 486 DX/50

Intel 486DX/50 CPU
CPU Cooling Fan
3 VESA Local Bus, Pentium Ready
256K Cache Memory
4M RAM Installed
170MB Hard Disk Drive 12ms
TEAC 1.2MB Floppy Disk
TEAC 1.44MB Floppy Disk
VLB 32 Bit Video Accelerator w/1M
FDD/HDD IDE Controller
Mini Tower Case 230W Power
14" NI SVGA Monitor .28
101 Enhanced Keyboard
Hi Resolution Mouse & Mouse Pad

Impossible Price ! **$1435**

Upgrade Options: Add Below Price	
VLB FDD/HDD IDE Cntr	*$35*
SVGA 15" .28 NI Flat	*$135*
SVGA 17" .28 NI VESA	*$495*
250MB Hard Disk Drive	*$45*
340MB Hard Disk Drive	*$130*

Best Service!

CP VESA 486 DX/33

Intel 486DX/33 CPU
Math Coprocessor
3 VESA Local Bus, Pentium Ready
256K Cache Memory
4M RAM Installed
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TEAC 1.2MB Floppy Disk
TEAC 1.44MB Floppy Disk
Trident Video Accelerator w/1M
FDD/HDD IDE Controller
Mini Tower Case 200W Power
14" NI SVGA Monitor .28
101 Enhanced Keyboard
Hi Resolution Mouse & Mouse Pad

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Upgrade Options: Add Below Price	
VLB Video Accelerator	*$40*
VLB FDD/HDD IDE Cntr	*$35*
SVGA 15" .28 NI Flat	*$135*
SVGA 17" .28 NI VESA	*$495*
250MB Hard Disk Drive	*$45*

Lowest Price!

CP 486 DLC/33

Cyrix 486DLC/33 CPU
Math Coprocessor Installed
128K Cache Memory
4M RAM Installed
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TEAC 1.2MB Floppy Disk
TEAC 1.44MB Floppy Disk
SVGA Graphic Card /512K
FDD/HDD IDE Controller
Mini Tower Case 200W Power
14" SVGA Monitor .28
101 Enhanced Keyboard
Hi Resolution Mouse & Mouse Pad

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Upgrade Options: Add Below Price	
DLC/40 Upgrade	*$35*
Trident 8900CL w/1M	*$30*
SVGA 14" .28 NI	*$30*
SVGA 15" .28 NI Flat	*$165*
250MB Hard Disk Drive	*$45*

CP 386 DX/40

AMD 386DX/40 CPU
8 EXPAND SLOTS
128K Cache Memory
2M RAM Installed
170MB Hard Disk Drive 15ms
TEAC 1.2MB Floppy Disk
TEAC 1.44MB Floppy Disk
SVGA Graphic Card /256K
FDD/HDD IDE Controller
Mini Tower Case 200W Power
14" SVGA Monitor .28
101 Enhanced Keyboard
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SVGA 15" .28 NI Flat	*$165*
250MB Hard Disk Drive	*$45*

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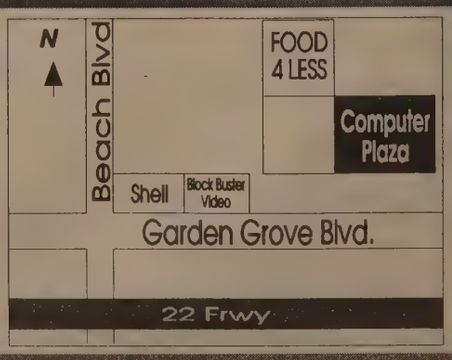

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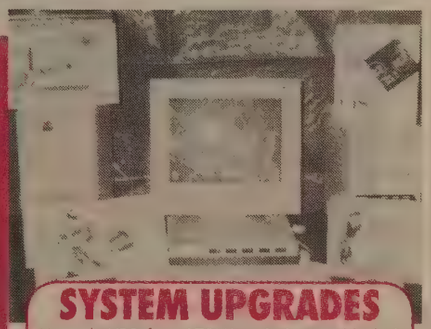
- 4MB RAM (Exp. to 32MB)
- Teac 1.2 MB (5.25") Floppy Drive
- Teac 1.4MB (3.5") Floppy Drive
- 260MB IDE Hard Drive
- 32-Bit VLB IDE with 2S/1P/1G
- 32-bit VLB Graphic Accelerator w/1MB
- 14" NI Full Screen SVGA Monitor
- Medium Tower w/200W UL Power Supply
- 101-Key Enhanced Keyboard
- 3 Button Hi-Res Mouse
- MS-DOS 6.0 Manual & Diskettes

486SX-25 VESA Local Bus	$1,255
486DX-33 VESA Local Bus	$1,425
486DX-40 VESA Local Bus	$1,435
486DX2-50 VESA Local Bus	$1,485
486DX-50 VESA Local Bus	$1,575
486DX2-66 VESA Local Bus	$1,625



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Upgrade HDD from 170MB to 540MB	360
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Colorado 250MB Tape Drive	185
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Omni 101 Keyboard	58
Omni Ultra Keyboard	75
Upgrade Monitor to 15" to 20"	CALL

486 VESA Local Bus Pro System

- Intel 486 Microprocessor
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- 256K Cache, AMI Bios
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- Teac 1.4MB (3.5") Floppy Drive
- 340MB IDE Hard Drive
- 32-bit VLB IDE with 2S/1P/1G
- Genoa VLB Graphic Accelerator w/1MB
- CTX 1560 15" NI Flat Screen Monitor
- Medium Tower w/200W UL Power Supply
- 101-Key Enhanced Keyboard
- 3 Button Hi-Res Mouse
- MS-DOS 6.0 Manual & Diskettes

486DX-33 VESA Local Bus	$1,785
486DX-40 VESA Local Bus	$1,795
486DX2-50 VESA Local Bus	$1,855
486DX-50 VESA Local Bus	$1,955
486DX2-66 VESA Local Bus	$1,995

Intel 486 Cache System

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- 4MB RAM (Exp. to 32MB)
- Teac 1.2MB (5.25") Floppy Drive
- Teac 1.4MB (3.5") Floppy Drive
- 170MB IDE Hard Drive with Controller
- Two Serial/1Parallel/1 Game Port
- Super VGA Windows Accelerator 1MB
- 14" Super VGA Monitor (.28dp)
- Mini-Tower w/200W UL Power Supply
- 101-Key Enhanced Keyboard
- 3-Button Hi-Res Mouse
- MS-DOS 6.0 Manual & Diskettes

486SX-25 MHz System	$1,125
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486DX-50 MHz System	$1,435
486DX2-66 MHz System	$1,495

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- Teac 1.4MB (3.5") Floppy Drive
- 170MB IDE Hard Drive with Controller
- Two Serial/1 Parallel/1 Game Port
- 16-bit Super VGA(1024X768, 512K)
- 14" Full Screen SVGA Monitor (.28dp)
- Mini-Tower with 200W UL Power Supply
- 101-Key Enhanced Keyboard
- 3 Button Hi-Res Mouse
- MS-DOS 6.0 Manual & Diskettes

486DLC-33 MHz Cache System	$1,049
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HP DeskJet 500C	385	Epson LQ-1070.	369
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Trident 9000 Super VGA card (1024x768, 512K)	$39
Trident 8900 Super VGA card (1024x768,1MB).	59
Cirrus Logic Super VGA Card (1024x768,1MB, Win. Accel.)	59
Cirrus Logic 5426 Super VGA (1024x768, 1MB, VLB)	95
Genoa 8500VL Super VGA (1024x768,1MB, Exp. to 2MB).	105
Diamond SpeedStar Pro Super VGA (1024x768,1MB, ISA/VLB)	125
Diamond Stealth 24 Super VGA (1024x768, 1MB, Win.Accel.)	165
Diamond Viper Super VGA (1024x768, 2MB, Graphics Accel.	395
ATI Ultra Graphics Super VGA (1024x768, 1MB, Win. Accel.)	179
Orchid Fahrenheit VLB (1MB)	165
Orchid Fahrenheit ISA (1MB).	165
Orchid ProDesign IIs (1MB)	145
Orchid Celsius VLB (1MB).	240
Orchid Celsius VLB (2MB)	299
ATI Mach32 VLB (1MB, up to 2MB).	380
ATI Ultra Pro (2MB).	355

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2400 Internal Modem	$35
2400 External Modem	69
9600/2400 Internal Fax/Modem	55
14400/14400 Internal Fax/Modem	165
14400/14400 External Fax/Modem	199
ZyXEL U-1496B Internal Fax/Modem	295
ZyXEL U-1496E External Fax/Modem	325
ZyXEL U-1496E Plus Fax/Modem	459
Pocket 9624 Fax Modem (Notebook)	99
Pocket 14400 Fax Modem (Notebook)	235

MONITORS

Shamrock 14" SuperVGA (1024x768, .39)	$199
Shamrock 14" Full Screen (1024x768, .28)	239
Shamrock 14" Full Screen (1024x768, .28, NI)	259
Orchestra 14" Full Screen (1280x1024, .28, NI).	269
CTX 1451 14" Full Screen (1024x768, .28, NI)	269
CTX 1560 15" Full Screen (1024x768, .28, NI)	185
NEC 3FGe 15" Flat Screen.	629
NEC 5FGe 17" Flat Screen	1125

NETWORK

16-Bit Ethernet Card (NE2000, Novell Certified)	$69
16-Bit 10BaseT Ethernet Card	79
Lantastic AI Version 5.0 (DOS)	75
Lantastic AI Version 5.0 (Windows)	85
Novell NetWare 2.2-3.12	CALL

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Mitsumi CD-ROM with Audio Spectrum 16 bit and 5 CD Titles	$370
Mitsumi CD-ROM (350ms, Kodak Photo CD)	175
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Sound Blaster Pro Deluxe Edition	135
Media Vision Pro Audio Spectrum 16 Basic	125
Media Vision Pro Audio Spectrum 16 (SCSI)	155
Media Vision Pro Audio Studio 16	209
Labtec SS-700 Shielded Stereo Micro Speakers	30
Labtec SS-1000 Shielded Amplified Stereo Speakers	95
CD Titles	CALL FOR DETAILS
Sony 561 SCSI (Bare Drive).	335
Philips Double Speed CD-ROM w/ Interface	225
Panasonic CD-562 (Double Speed, 315ms)	235
Teac (Double Speed, 265ms)	345
SoundBlaster Pro Sound Card	165
Video Blaster.	385

CONTROLLERS

DTC 3270VL SCSI-II Controller	$120
BusLogic 32-bit VL SCSI-II KT-445s.	275
BusLogic 16-bit SCSI-II KT-542b	225
UltraStor 14F SCSI.	215
UltraStor 34F VESA Local Bus SCSI 32K	275
Tekram DC680 VLB IDE Cache	150
Tekram DC600B ISA IDE Cache	99
Tekram DC620B EISA 32-bit IDE Cache	175

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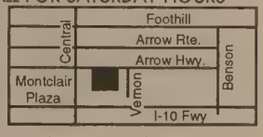

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386DX Series

33MHz/64K Cache $439
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486DX Series

DX33MHz/256K Cache $699
DX50MHz/256K Cache $849
DX2-50MHz/256K Cache $829
DX2-66MHz/256K Cache $919

SYSTEMS INCLUDE :

- 1MB Memory
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- IDE FD/HD Controller
- 1.2MB or 1.44MB FD
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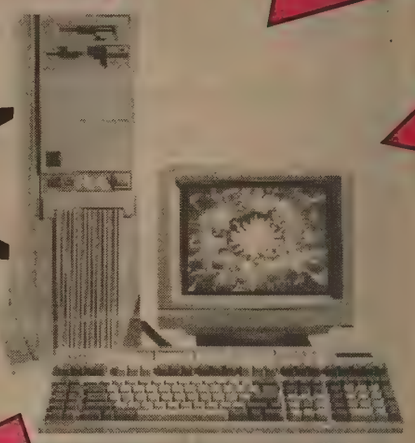

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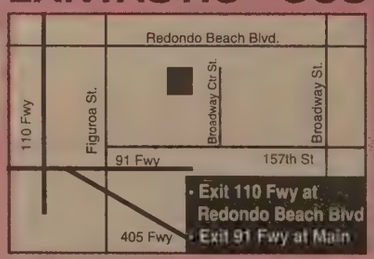

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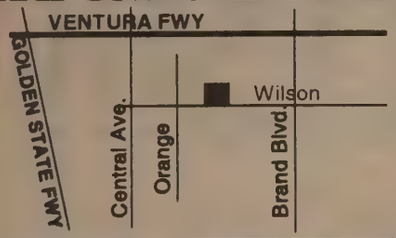

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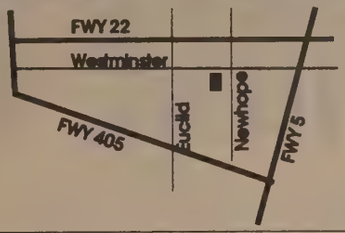

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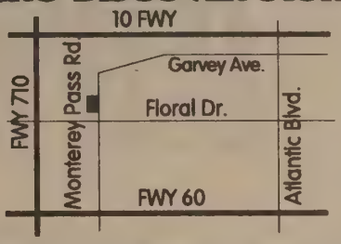

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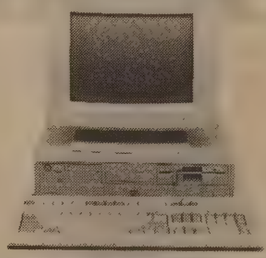

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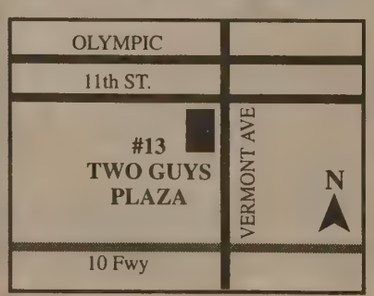

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The New CPUs And The Software That Runs On Them

An Interview With Microprocessor Report Publisher Michael Slater

By Mary Eisenhart

Photo: Michael Jay

Today's platform wars may cause many of today's computer users to wonder, idly or otherwise, whether their next machine will be based on Pentium or some RISC chip, and system administrators to fret over what virtual corners they'll paint themselves into by going with Windows or System 7 or OS/2 or any of dozens of UNIX dialects.

For the people who design the products these customers use, in-depth understanding of the technical subtleties of hardware and software is indispensable. Programmers need to know every possible nuance and quasi-documented feature of the chip they're writing for; competitors need analysis of what their rivals are up to; designers of specialized chips and boards need to make their products work with those of other vendors.

Founded in 1987, Michael Slater's *Microprocessor Report* newsletter has become a vital resource to the technical community. His company, MicroDesign Resources, now produces the six-year-old Microprocessor Forum conference, the new Microsystems Forum conference, and another newsletter, *Microsystems Insider*, that debuted in October. Also due soon is a series of studies, which Slater compares to market research reports with a crucial difference: "Our focus will be the opposite of the traditional market research reports. The typical market research report has a very cursory, usually not very accurate, coverage of the technology and the products, and lots and lots of depth on what the markets are and how big they expect the markets to be. We're going to be just the opposite."

Seeking insight on the matter of where it's all going and how to plan for it, we recently paid Slater a visit in his rural office in Sebastopol. (MicroDesign Resources, 707/824-4004, 1-800-527-0288).

All the products we know and love are coming to the end of their life cycles—people are trying to figure out whether to go with Pentium or PowerPC or Sparc or MIPS or whatever.

What do you think are the issues that are going to drive this? Is Intel going to own the world forever? If so, why? If not, why not?

That's a big question.

There's always a tradeoff in any technology decision between doing the most effective, efficient, innovative thing, and maintaining compatibility with what you've done before. Every time somebody does a new design, they have to weigh the benefit of compatibility versus the benefit of not worrying about compatibility.

The RISC architectures came from mostly academic design groups who, unlike the commercial microprocessor companies, were willing to say, "We don't care about the installed base. We don't care about compatibility with anything that exists. We're going to be pure." And as a result they came up with a new architectural style that was a better match for the state of technology at that point in time. Instead of being something that was five layers of incremental improvements on something that was fifteen years old, it was, "Okay, reset, start

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from scratch. Design something brand new on the assumption that you've got hundreds of thousands of transistors per chip, that you're going to have a 32-bit architecture, that you're going to have all your software written in a high-level language."

This is a whole different set of assumptions than when the x86 and 68000 architectures were designed, when you had ten or twenty or thirty thousand transistors per chip, lots of software was written in assembly language, processors were not highly pipelined, and clock rates were lower. It was just a whole different technology environment.

That's how the RISCs came about, and they are still facing the challenge of how to get an acceptable software base, having made that break. The advantage, obviously, of just moving ahead with the x86 architecture is that you get to carry along all the old software.

And the disadvantage is that you have to carry along all the old software...

Right. And that you have to live within the constraints that that imposes.

Certainly if we look for other examples in the history of technology to try and come up with precedents for this, the typewriter provides a very compelling case for Intel. Because for I don't know how many decades, but a long time, people have known that there's a much better keyboard layout than the one we all use, but the advantages of compatibility have outweighed the benefit of having the more efficient layout.

I think that's what Intel hopes will keep the x86 architecture alive forever, and it obviously depends on how high the price is that you pay for sticking with the old stuff. What's the price of compatibility and what's the threshold of pain in going away from that easy, compatible environment?

In the x86 world, there is now a lot of choice of vendor—you can decide whether to buy a Cyrix processor, an AMD processor, an Intel processor; you can decide whether to buy a 486 system or a Pentium system. In some sense, none of those choices are important, because no matter what choice you make, it all runs the same software. Really the only question is price/performance.

They all run the same software; the machine's going to do the same thing; and the only question there is, "Am I going to get enough performance to be worth the extra price of going to this other product, or am I going to be burned in some way if I save the money and buy this off-brand product?" But it's really not, in a fundamental sense, a very important decision. No matter what you do, you're going to end up with something that's probably acceptable.

There's always a trade-off in any technology decision between doing the most effective, efficient, innovative thing, and maintaining compatibility with what you've done before.

As soon as you look at going to one of the RISC architectures, like MIPS or Alpha or Sparc, you're now looking at a whole new software environment, so that is a much, much more difficult decision to make. You also get more benefit from doing it, if it works for you, in that you get out of all the technology baggage that the x86 carries with it.

The RISC processors do provide significantly higher performance at about the same price, at least at the chip level. Or you can get chips at about the same performance at significantly lower prices, for RISCs as compared to x86. One of the reasons they haven't taken off as much as some people had hoped is that the advantage in chip price has not been translated to an advantage in system price, in many cases, because the companies building the RISC systems have generally operated at much higher profit margins than the PC industry, which operates at astonishingly thin margins. If you have one company living on a 10% profit margin and another company living on a 30% profit margin, that difference will completely obliterate any advantage that the RISC processors have, if the RISC guys are living on those high margins.

There's also the fact that UNIX software, as contrasted to PC or Mac software, can be priced almost an order of magnitude higher for the same application, because they're not used to dealing in volume. This is one of the

continued on page 75

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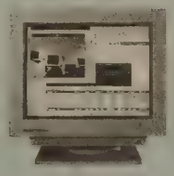

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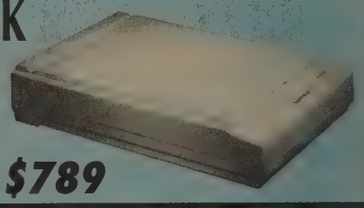

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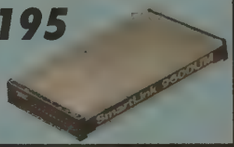

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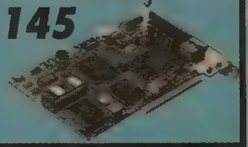

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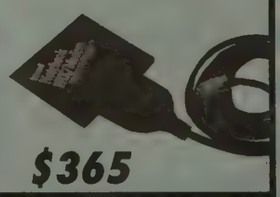

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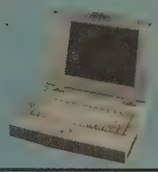

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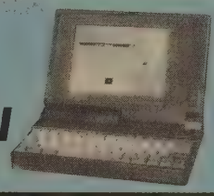

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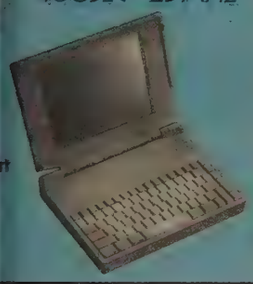

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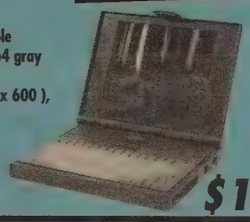

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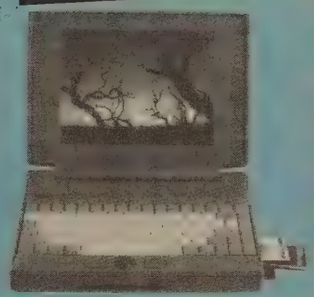

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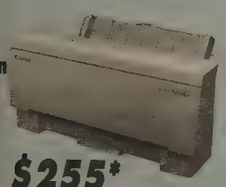

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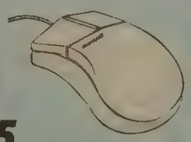

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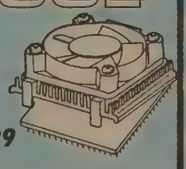

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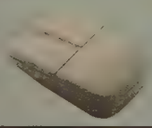

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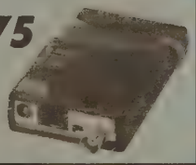

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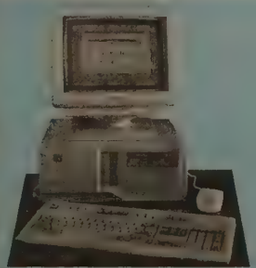

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continued from page 70

big barriers, I think, for people who might like to migrate to, say, SGI, but are horrified at what the same software they're currently using would cost.

The UNIX world has a whole series of problems that have kept it from ever becoming a real player in the real PC business. One, as you mentioned, is that applications tend to cost much more for basically the same application, because it tends to be more support intensive, and they're selling into a smaller market so they need to amortize their development cost over a smaller number of units.

Also, just the complexity of using and administering UNIX has been an enormous barrier, and there is also the fact that there hasn't been *a* UNIX, but dozens of UNIXes, each of which required a different version of the application software.

Maybe that's getting fixed now, but I think it's too late for UNIX to become a high-volume product. The chances for UNIX to ship millions of units a year have ended.

The operating system that is giving the RISCs an opportunity to play in the PC space is Windows NT, which has a couple of key advantages over UNIX. One is that it provides compatibility with the Windows applications, which is the applications that people want to run today. It's provided by Microsoft, and Microsoft is the company that has relationships with every single maker of PCs, that probably has on its mailing list every single user of PCs, and that has relationships with every software distribution channel in the PC market. They've got an enormous ability to move that product, if they decide to do that, and if it meets people's needs.

For the RISCs getting into the PC market in the near term, they've got a couple of enormous, and, I think, insurmountable, problems, as far as getting to high volume. One is that they don't run Windows 3, they run Windows NT. For someone to use a RISC system, they first have to decide that they want to run Windows NT. I think it's going to be a very small number of people that decide they want Windows NT on any architecture.

It's big, and it's as complex as UNIX...

Well, it's probably not as complex to administer as UNIX, but it needs at least 16MB of memory, probably 20 to 32MB of memory in a reasonable configuration. It needs probably at least 70MB of disk space for just the system files and maybe an application or two. You're looking at probably a couple of hundred megabyte disk drive, minimum.

So your low-end entry-level PC is not going to run it adequately, and you're going to need a top-of-the-line 486 to get adequate performance on it. And yes, it will run your Windows 3 applications, but they'll run a little slower than they ran on Windows 3, so why would you want to make this change?

Well, you might want to make it because you like the idea of having something that provides preemptive multitasking, and multithreaded applications. Even though a lot of users probably don't understand what either of those things mean, what they *will* understand is that they would like the system not to crash entirely when one application fails, and memory protection in Windows NT will buy them that. They would like to have the foreground program continue to run smoothly while they have things going on in the background—being able to have a high-speed modem transfer going on in the background, and printing in the background, and still have your mouse movement be smooth and your word processor not stutter as you type characters, that's what preemptive multitasking will do for you.

Multithreading means that when you are in your page layout program and you say, "Print," instead of having

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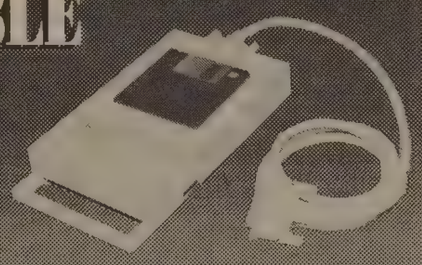

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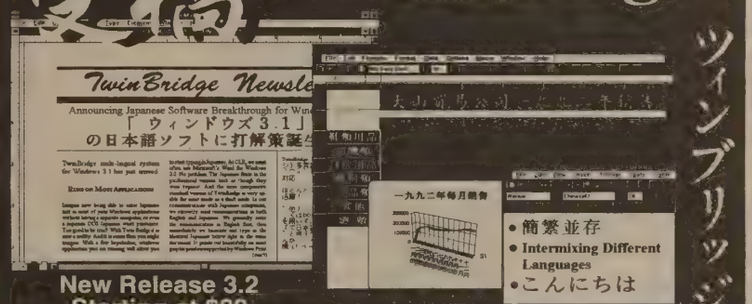

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your system essentially locked while it prints to the print spooler, the print job gets spawned as a background task; writing to the print spooler is done as a background thread while the foreground continues to work.

A lot of what people will see is that the foreground task continues to work, no matter what's going on in the background. These seem like obscure technical advantages, but they ultimately will deliver real simple benefits that everybody will appreciate.

But, are you willing to buy a new operating system, buy another 16MB of RAM, in order to get those benefits? Well, you might be if it was the only way to do it. But the thing that is really going to stunt the growth of Windows NT is Microsoft's own alternative, the product they talk about as Chicago, which will be called Windows 4, I suspect, when it's announced.

Certainly Microsoft is, through its own products, severely restricting the Windows NT market, but this is something they understand very well. It's not something they're doing by accident.

It's important for Microsoft to have a product to upgrade the installed base, and Windows NT is not an acceptable installed-base upgrade. Moving your base system from 4 to 16MB is not an acceptable upgrade.

And they've got this x86 software base out there that doesn't really care about portability. If you have a 486 system and you want an upgrade, you don't really care if that upgrade operating system will run on other microprocessors. And some of the other things that Windows NT has, like C2 level security, or support for multiple processors, just aren't going to matter to very many people.

So Chicago is really a better solution. Or I should say, what Chicago has promised to be promises to be a better solution. It's at least a year away, probably, from shipping to users.

But Chicago is there on the horizon, and will give users an upgrade that will give them preemptive multitasking, and will give them memory protection, and will give them multithreaded application support and 32-bit addressing—all the good things about Windows NT except for security and multiprocessor support and portability to other architectures. It's simply a much more effective upgrade for most users, and for new system purchasers it's going to be a better alternative.

Basically, Windows NT is only applicable to those people who either don't want to wait for Chicago—they want something now that will give them preemptive multitasking and multithreading and so forth—or for whom things like multiprocessor support or the few things that Windows NT gives them that Chicago doesn't are valuable. For a large company building a corporate mission-critical system, the fact that it has C2 level security may be enough to say, "We're willing to pay for 16MB of RAM. Plus we want to start building it now, we don't want to wait a year till Chicago maybe comes out."

The operating system that is giving the RISCs an opportunity to play in the PC space is Windows NT, which has a couple of key advantages over UNIX.

Chicago is Intel-specific, right?

Chicago is Intel-specific. It's still full of assembly language. It's not written in a high-level language.

I think the NT market is going to be a couple percent of the PC market. I think a wild success scenario for NT at this point would be 5 or 10%—ten percent's probably almost inconceivable. And of that small piece of the PC market, most of the people that run NT are probably going to run it on a Pentium machine, maybe a 486DX2. It's a small piece of that relatively small Windows NT market that's going to want to buy a RISC machine, and that piece is going to be divided among several different RISC architectures, so the size of the market for each of those RISC architectures on Windows NT is not going to be millions of units.

It could still be a significant opportunity within the scale of the volumes they're at today. MIPS-based systems are on the order of eighty thousand units this year; 486 systems are at about forty million units this year. It's a fraction of 1%. A tiny little sliver out of the PC market could double and triple and quadruple MIPS's volume. Yes, there are significant opportunities there for MIPS. No, it's not going to cannibalize a major piece of Intel's business in the near term.

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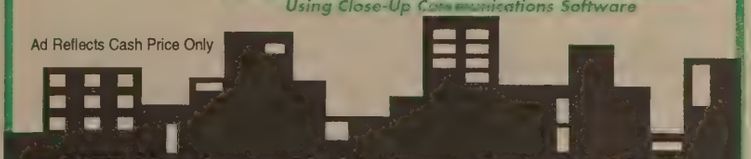

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Now the scenario that could lead to more shift is, over the next several years, the RISC processor vendors get more and more peripheral chips and support chips developed; they get a couple of PC vendors building the systems; they get all the infrastructure in place so that people can build RISC-based systems as easily as people build x86-based systems today. Software developers more and more are writing everything in high-level languages—gradually they'll probably pay attention to porting to another architecture, just because it's an opportunity that's there that they probably shouldn't ignore forever. And memory gets cheaper and cheaper, so in, say, 1996, 16MB is probably an entry-level system.

As long as Windows NT doesn't keep increasing its appetite faster than memory prices go down, there should come a point somewhere in the second half of the decade where the additional resource requirements of NT are not a problem, and where software developers are starting to routinely provide portable versions of their software on different architectures, and all the hardware infrastructure will be there.

So I think these next few years are not really a chance for the RISC architectures to become high-volume platforms that will take major pieces of the Intel market, but there is an opportunity for them to build the infrastructure, build the support, so that later in the decade they might be able to find an opportunity to get a wedge and actually get a higher-volume piece of the market. It won't be with Windows NT per se, but with Cairo, which is the next-generation follow-on to NT.

The thing that is really going to stunt the growth of Windows NT is Microsoft's own alternative, the product they talk about as Chicago, which will be called Windows 4, I suspect, when it's announced.

From an OEM or user standpoint, what are the weaknesses in Pentium that another vendor might want to exploit?

It's pretty much just an issue of price/performance.

The clichés are that it's hot, it uses too much power, it takes too much silicon wafer to build...

But those same problems apply to most of the RISC processors. Alpha takes substantially more power than Pentium. The high-end MIPS parts, the R4400s, are right in the same ballpark.

The concerns about Pentium using so much power were really not Intel's problem, they were the PC industry's problem. It was the problem of an industry that, for the most part, had little to no engineering capability, and basically just bought chips, stuck them on boards, put them in boxes, and stuck a fan in the back. You can get away without doing any real thermal design when you've got parts that are using 2 and 3 and 4 watts; when you try to take a 12- or 15-watt chip and stick it into that same basic mechanical design, it overheats. You simply need more cooling, and that's just a fact of life; the PC makers just needed to get more sophisticated about the sort of cooling they provided.

If you put aside for a moment the enormous software handicaps that they're faced with, the advantage the RISCs have, from a technical point of view, is that they are more efficient in terms of the number of transistors it takes to build a chip to achieve a certain level of performance. If you look at the low-cost MIPS chip—like the 4200, a low-cost version of the R4000—it provides about the same performance as Pentium and is cheaper than a 486DX. It's actually about the same die size as the 486DX; it uses about the same amount of silicon. The Alpha chips are not as small or as cheap as that, but some of the Alpha chips are significantly faster than Pentium in terms of performance, but at roughly the same price and die size and power consumption.

So all else being equal, the RISC chips will either deliver higher performance at the same price, or comparable performance at a significantly lower price, because they do have that fundamental technical advantage.

In terms of price, it's probably better than a two to one advantage today. You can get Pentium-level performance out of, say, a PowerPC chip, or a MIPS 4200, for less than the price of a 4860X2.

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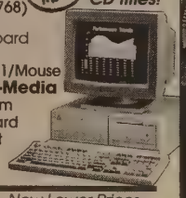

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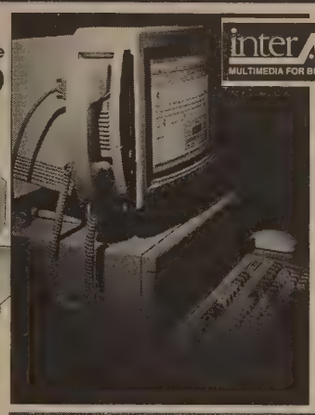

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how it fits into the scheme of things. We're only starting to see product...

Well, that ties us back into 68000s and Motorola and Apple.

PowerPC will have its initial significance as the inheritor of the Macintosh installed base, assuming that Apple pulls off this transition. Apple is at an incredibly delicate point in its evolution here. If they bungle this transition, people are going to switch to Windows en masse. It could be catastrophic for Apple if they don't make that a smooth transition.

But on the other hand, if they are able to pull off this transition in a reasonably smooth fashion, it should enable them to provide significantly faster machines than the x86-based PCs at comparable price points. It would be really the first time in the history of Apple where they would have a raw price-performance advantage. They have succeeded so far not because of a price-performance advantage, but in spite of *not* having a price-performance advantage. They could do that when they had such an enormous advantage in software, but now that their advantage in software has been whittled away, they need to get to a point where they've got some hardware advantage. PowerPC could give them that.

The initial PowerPC chip, the 601, does sell for about the price of a 486DX and delivers substantially better than Pentium performance, especially on floating point applications, although floating point is less important to most users. But for a CAD user, for example, the advantages are quite large.

Could you explain about the significance of floating point?

It's a tough one to explain without getting into a really technical discussion, but basically integer code is dealing with regular old whole numbers, or fractions, whereas floating point code represents numbers as a mantissa and an exponent. It's just like scientific notation, where instead of saying "The number is thirty-seven billion," and having to have an integer the size of thirty-seven billion, you say, "I want a 37, and put this many zeros after it."

It's a two-part way of representing numbers that lets you get a vastly greater range, from very, very small numbers that you can still maintain with high precision, to very, very large numbers.

The penalty is that doing arithmetic on integers is a relatively simple thing to do, from a hardware point of view. The number of transistors it takes to build a circuit that will add together two integers very quickly is much, much smaller than what it takes to add two floating point numbers very quickly. With floating point numbers, you have to first normalize them so that they both have the same exponent, and then you have to add the mantissas, and then you have to renormalize—it's a multistep, relatively complex process.

PowerPC will have its initial significance as the inheritor of the Macintosh installed base, assuming that Apple pulls off this transition... if they bungle it, people are going to switch to Windows en masse.

There are lots of tradeoffs in building hardware to do floating point. You can build hardware to do floating point math in relatively few transistors by allowing it to be quite slow and doing it as an iterative multiple step process. If you want to make it as fast as integer arithmetic, then it takes relatively large numbers of transistors.

Intel did not devote those transistors to making floating point fast in the 386 and 486 implementations. In Pentium they did throw a lot of transistors at it, and they actually have a raw floating point engine in the Pentium chip that is comparable to most of the RISC floating point engines. But there are some fundamental weaknesses of the floating point architecture of the x86. It does not have a general-purpose register file; instead it has this stack of registers, that is a far less efficient way to access the working memory being used by the floating point processor.

Pentium has vastly better floating point performance than the 486 did, but even with Pentium, it's way behind the fastest RISC processors in terms of floating point.

In terms of how this shows up to users, most users don't use applications where floating point performance is very important. Things like word processors and databases gen-

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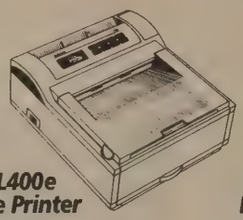

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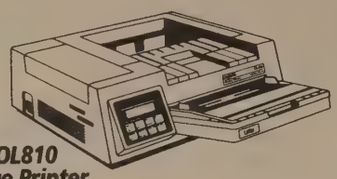

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erally use no floating point at all. Spreadsheets may or may not use floating point; trigonometric functions are generally done in floating point, so if you have a spreadsheets that's doing sines and cosines and things like that, that might need floating point. Some other functions in spreadsheets might be done in floating point. But even normal-sized business sorts of spreadsheets are not going to spend a huge percentage of their time doing floating point calculations.

Two-dimensional drawing programs often don't use any floating point. If floating point were available and inexpensive, those programs probably would have used it. But in fact, those programs have been written for the PC environment, where floating point was not something you could assume everybody had, so they avoided using it.

Now 3-D graphics is a case where you just need floating point, so 3-D graphics programs are very sensitive to floating point performance. This is why machines like the Silicon Graphics boxes and all the RISC workstations have had much, much better 3-D graphics performance than PCs. They also have much better graphics hardware, which is part of it, but part of it is also having processors that simply have much better floating point performance.

Lots of scientific simulations use lots of floating point. If you're trying to model the weather patterns of the world, or nuclear explosions, then floating point matters a lot.

If Apple can pull off this transition, it should enable them to provide significantly faster machines than the x86-based PCs at comparable prices. It would be the first time in the history of Apple that they would have a raw price-performance advantage.

I was at this Autodesk conference the other day, and Carol Bartz was saying that CAD and 3-D design and all this stuff which is considered a niche nowadays is about to be a lot more mainstream than it was. If so, is this going to drive a migration from one platform to another? For example, are all the people that have been running AutoCAD on 486es suddenly going to move to Suns or SGIs or PowerPCs? And is multimedia going to make a difference?

Multimedia is a complex issue, and the RISC architectures may have some advantage there, but I think there are vastly greater issues of system architecture and software design and support chips and user demand, that are all probably more important than the processor architecture.

But as applications get more sophisticated and as they move into more 3-D-modeling sorts of tasks that do use floating point, the performance advantage of the RISCs does increase. It gets back to this tradeoff of, if I move away from the x86 architecture, I have to put up with some degree of pain, because I now have to replace my applications, and there are fewer applications available, and so forth. I get some payback for that pain, which is a boost in performance. The more floating point my application uses, the more payback I'm going to get.

The classic candidate for a RISC Windows NT machine today would be not a mainstream user who all of a sudden somehow finds 3-D modeling attractive, but the classic AutoCAD sort of user who spends 90% of his workday using AutoCAD. He probably doesn't care very much about other applications, and AutoCAD probably will be ported onto all these architectures.

There is a class of users that predominantly uses a few applications, where performance is really critical on those applications, where that person's work productivity would be significantly enhanced if those applications ran faster. The companies that develop those applications are the companies that are going to port to all the RISC architectures, because they know their users are looking for maximum performance. And the users of those applications are the kind of people that are likely to want to buy a machine, because it is much faster even if it only runs a small fraction of the software base.

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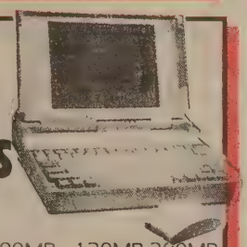

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this delicate transition to make, but presumably over the next couple of years they will shift their customer base over to PowerPC machines, or at least their new customers. I think that by doing that, PowerPC might be able to get the 10% piece of the desktop computer market that Apple now holds.

Their ability to get beyond that is going to depend upon operating systems beyond Apple.

That is to say, also beyond Taligent and Kaleida and all that?

Yeah. Who knows what will come out of Taligent, but I have a hard time finding anybody these days who thinks that it's going to be a high-volume product. Few people seem to view Taligent as a next-generation replacement for anything that exists. It's a new thing that will establish a niche, but it's a niche product, not the next-generation mainstream replacement.

Apple missed an incredible opportunity. I think it's one of the worst business decisions in the history of the PC business not to license the System 7 software to other hardware manufacturers. If they had done that—

It's *so* much better than Windows...

Well, actually, you know, the thing is it's not any more. We're a Mac shop at our office, but Windows has gotten a lot better, and System 7 hasn't gotten a lot better. Chicago is going to blow away System 7 unless System 7 gets dramatically better. I hope it does.

But my point was that if, before Windows 3 shipped, Apple had licensed System 7, System 7 would be the dominant graphical user interface and the dominant operating system in computers today. Because they didn't do that, Windows has really taken over. It has so much more momentum than the Macintosh market, and so much more development effort behind it, that I think at this point even if they were to license it, it would have relatively little effect.

And they are still saying that they have not made a decision to license System 7 on PowerPC. They're allowing other companies to build UNIX systems that also have System 7 application compatibility, but you can't just build a System 7-on-PowerPC system, as Apple will for its own PowerPC Macintoshes. So it remains essentially a proprietary platform.

Companies like Motorola and IBM which are trying to sell chips are looking for ways to have a larger piece of the business than Apple is going to be able to capture for the PowerPC

The classic candidate for a RISC Windows NT machine would be not a mainstream user who all of a sudden finds 3-D modeling attractive, but the user who spends 90% of his workday using AutoCAD.

processors, so they are clearly very interested in Windows NT. There has not been any formal acknowledgment that they're doing a PowerPC port of Windows NT, but it's been very widely rumored, and I'm convinced that it is happening and they're just not ready to talk about it quite officially.

I think one of the reasons that there have been so many rumors is that at the same time they don't want to talk about it, they probably are happy for everybody to know.

Motorola, I sense, does have a very deep commitment to PowerPC, as their long-term opportunity to become a player in the PC market. I get the feeling that they do understand that this is not a one- or two- or three-year plan; this is a five- or ten-year plan. It's "What can we do so that eventually there is a chance that the x86 architecture doesn't dominate the PC business?" They're making a very significant investment, and I think are going to have the patience to wait it out for several years for that market to grow.

I think they've got a significant chance to be the leading player as we get to this next transition I'm talking about—not this transition from Windows to Windows NT or Windows to Chicago, the next one. It's after everyone's upgrading from Chicago to the next thing, and from Pentium to whatever's after Pentium, and from all of today's RISC processors to the next batch of RISC processors, probably the same architectures but a different set of implementations. It's that transition, in the 1996–97 sort of time frame, where I think there might be an opportunity, somewhere along that way, for Motorola to make a real hard push with PowerPC and establish it as a higher-volume standard.

If over these next few years they can find a niche for it and build the infrastructure and get the software ported, it's not going to be millions of units overnight, but it could be millions of units eventually. They'll have Apple's volume and IBM's backing to give them revenue to fund continued development without being dependent on the PC market to generate that revenue. And they also have the wild card of IBM's personal computer operation, where if IBM decided to push PowerPC-based systems running Windows NT, they would have certainly the ability to make a significant dent in the marketplace.

The advantages of the RISCs are going to be the greatest in the things that are doing floating point, which would be primarily 3-D graphics and simulations and modeling and things like that. Three-D graphics is something that people have viewed as sort of an exotic application, but if you could buy an inexpensive machine that had good 3-D graphics performance, then all this sort of virtual reality stuff, being able to sketch out a design for your house and then do a 3-D walkthrough—there are plenty of accessible consumer-like applications that would be made possible by high-performance 3-D graphics.

And in that area, PowerPC or another RISC chip would have a bigger advantage over the Intel architecture.

Now I think all this is not lost on Intel. Clearly in their public positioning they can't say anything but "x86 forever," right?

Although at one point a few years back they were doing RISC development and making a fair amount of noise about it.

Intel certainly has the technical ability to do a RISC architecture and implementation that would rival anything that's out there today. The question is how they fit it into their business strategy.

Well, they did two RISC architectures. They did the 960, which they decided to focus on embedded applications so as not to confuse the market by competing with the 386, and they did the 860, which was really conceived as a floating point accelerator to work alongside an x86 microprocessor. There was an ill-conceived decision to try and push it as a UNIX engine, for which it was exceptionally poorly suited and therefore failed. It was also late to the market.

But Intel certainly has the technical ability to do a RISC architecture and implementation that would rival anything that's out there today. The question is how they fit it into their business strategy. If they were to just invent a new RISC architecture and say, "Here's our new RISC chip," they would have no built-in advantage over all the other RISC competitors and be too late to the market to play that angle.

So my favorite scenario for something I think they could do over a period of time would be to introduce essentially a new mode. You can think of it as building a dual-mode chip that would be a RISC processor that would also have an x86 emulation mode. But it would have a real RISC processor at its core. Whereas people sort of talk about the Pentium as being that, but it's not. There is no RISC core that you can find anywhere in Pentium. It uses a lot of the same techniques that the RISC chips use, but the complexity of the x86 instruction set pervades the chip.

But you could build a processor that had a real RISC streamlined core, fixed length instructions, all the good things that make RISC more efficient, and then have some sort of translation engine on the side, for x86 code. In theory, if you had such a processor you could sell it as an x86 processor. It would not be as cost-effective as a pure x86 processor, but Intel might, for example, choose to accept very low profit margins on that part to establish it in the marketplace. They certainly have enough cash to do that—they're sitting on more than three billion dollars in the bank currently.

They could have a Trojan Horse scenario, where this RISC architecture sneaks into the marketplace because everybody buys these chips just as x86 chips and runs their x86 software on them. And one day Intel starts telling software developers, "Gee, there's actually millions of these things out there, so if you recompile your code for this new

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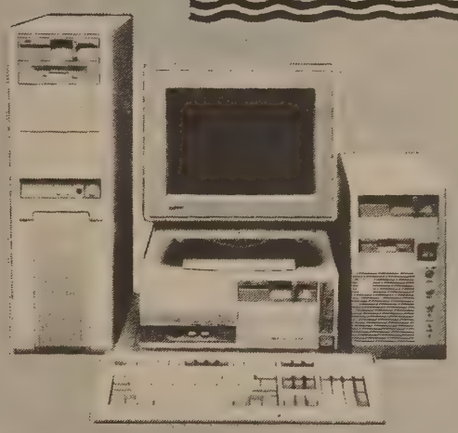

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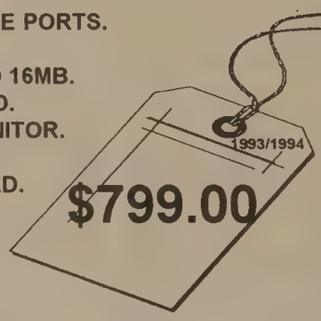

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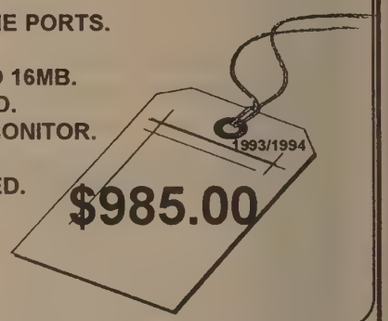

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architecture, and set this bit that causes the processor to flip into this new architecture mode, then you can take advantage of this new architecture." And then eventually a few years later, if all the software developers have done that, the high-end processors can start dropping the x86 support hardware. And at that point, Intel has made an evolution to a pure RISC architecture.

I think it's a conceivable scenario. I certainly don't pretend to know what Intel's actually doing. There are a million practical details that must be dealt with. So it's more of a thought experiment than a business plan, but something like that could enable Intel to gradually move away from the limitations of the x86 architecture, though they would argue today, at least publicly, that it's just not necessary; that the limitations of the architecture are real—at least the honest people there will admit that they're real—but that they're not so great as to ever cause them to lose significant market share.

Being 30–50% slower than the fastest RISC processor is not going to be enough to get people to put up with an enormous software transition. The vast majority of the market

Being 30–50% slower than the fastest RISC processor is not going to be enough to get people to put up with an enormous software transition. The vast majority of the market is a few years behind the leading edge of performance, so the fact that your leading edge is a year behind the other guy's leading edge just doesn't make very much difference.

is not at the leading edge of performance. The vast majority of the market is a few years behind the leading edge of performance, so the fact that Intel's leading edge is a year behind the other guy's leading edge just doesn't make very much difference.

How important do you think it is that all these operating systems—Solaris and Nextstep, not to mention NT—are portable and non-CPU-specific?

I think it's just a matter of developers saying "Let's do a reasonable thing with the technology that exists." Software is tied to CPUs not because anybody wanted it to be that way, but because to get acceptable performance you had to write in assembly language. As processors have gotten faster, and compilers have evolved, and programming styles have changed, there has been an almost complete shift to writing in high-level languages.

Once you're writing in a high-level language, if you just pay a moderate amount of attention to portability concerns, your software is portable. So given that there is all this tumult going on, clearly it would be a foolish thing to make any major software investment in something that wasn't portable. Why lock yourself in?

You could make a reasonably compelling argument today that says if you're only concerned about the reasonably near term, locking yourself into the x86, if you're focused on the high-volume market, might be a reasonable thing to do. But locking yourself into any other architecture would clearly be foolish, and locking yourself into the x86 architecture would be foolish if you cared about the leading performance edge.

Looking at non-CPU chips for a moment, what do you think are some of the interesting applications and opportunities?

There are a lot of them. I think in ten years the majority of high-performance processors will not be in things perceived as general purpose computers. Even today, the vast majority of processors are not in computers.

The biggest computer market is the 486 market, which is around forty million units a year. Embedded processors sell well over a billion units a year, but they're at an average price of probably a dollar or two. They're typically very cheap, very small, relatively

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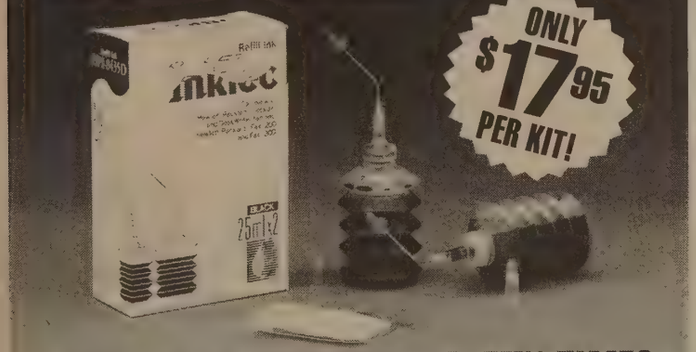

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slow processors. But the embedded market is huge, and moving to more and more high-performance microprocessors.

A couple of consumer applications are the scene of huge new platform battles. One is these is PDA/Personal Communicator/Mobile Companion computers, whatever you want to call them—some sort of thing that you can carry around with you that has your phone directory in it, and you can take notes on it, and you can do communications with it.

I am a believer in that market. I think the existing products clearly are deeply flawed, but it's more their implementations that are flawed than the concept. I think they're sort of at the stage PCs were at in the early '70s, when we were looking at Northstars and Cromemcos; eventually the IBM PC and the Macintosh of PDAs are going to emerge, and it's going to be a very, very big market. And it requires entirely different software than desktop computers, and therefore is open to all architectures. It does not have the barrier to entry that the desktop market has, because it needs new software no matter what.

It also needs to draw a lot less power, which could give different chips an advantage.

Right, although those same requirements exist for notebook computers, so there are x86 implementations focusing on the same requirements. And the x86 architecture will be a player in the PDA market, there's no doubt about that, but they're going into that market with a little bit of a disadvantage instead of the overwhelming advantage that they have in the desktop space.

I think that's one of the areas to watch, and the other one is the set-top cable boxes, which is turning into a platform battle. Everybody's doing them. Intel and Microsoft are doing this deal with General Instruments. SGI has the Nintendo deal and is also involved with one of the cable companies. Motorola, with the PowerPC stuff, has a deal with one of the cable companies. There's half a dozen efforts there, and you need about a three-dimensional picture to chart all the alliances and who's working with whom. I think that also is in a very early stage, and by the time it's real, everything will look different than it does today.

But it's clear that there's an enormous opportunity there, in that everybody's got TVs, you've got this cable coming into your house, and the bandwidth on that cable is largely wasted. There's so much more that could be happening.

The home computer, I think, is going to be the TV, which also is going to do other things. Some of them are very mundane in a sense; without requiring any new infrastructure, without requiring really anything significant that's not already existing today, you could make enormous advances in ease of use and general usability of TVs.

For example, you could imagine where at the beginning of the week you push some button and get a chart on your screen that's like those little at-a-glance pages in the *TV Guide*, that lists all the channels down one side and all the times across, and what the shows are. You could look at that and just point to the shows you wanted.

Or maybe it won't worry about what time things are being broadcast, since that won't matter anymore; it'll just list things by category and you'll just point to the things you're interested in. And then automatically the system will just record all those things, and then when you want to watch something, you'll just go over and say, "Give me the list of things that are recorded." You'll get a list, you'll point to what you want to watch, and it'll play.

The only piece of technology missing from that scenario today is you need a little low-cost 10GB storage medium, but in a few years that's not going to be a problem either. Storage is on this wonderful curve where it just keeps getting cheaper and cheaper.

That's just the most pedestrian of things, but I think it would be fairly compelling as a use for computing power inside your TV. And then you can get into all the interactive stuff, and the information delivery; clearly there's going to be another big platform battle there, where everybody's going to want their processor to be the processor in that set-top box, because that box will also run video games. You'll go buy CD-ROM games that will go into that box on your set-top, and your TV will do things for you without even using any broadcast programming.

In a way, it sounds like what people were trying to do with Atari game machines almost twenty

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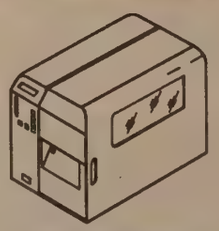

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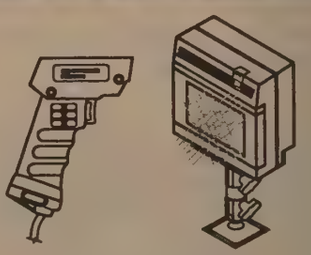

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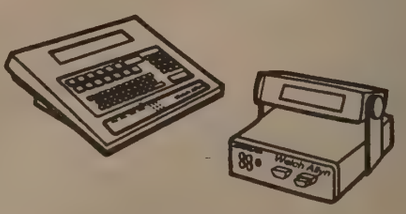

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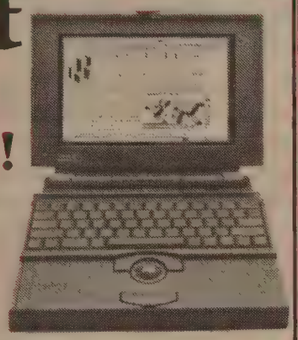

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years ago. Why is it going to be real now?

Well, you can look at Sharp Wizards and say, "Gee, Sharp Wizards have been around for years, and they never took over; why are these other PDAs going to take over?" All these things provide some utility, and at the same time they are a hindrance. For me personally, for example, the hindrance of using a Sharp Wizard is significantly greater than the value it delivers to me, so I'm not going to do it.

The same is true with the Newton today. The Newton comes closer, and if Newton just had good handwriting recognition it would actually be there for me. For me,- a Newton with highly accurate handwriting recognition would provide more than enough value for me that I would carry it around all the time.

A box on top of the TV with the sort of computing power and storage that you could afford to deliver to a consumer ten or fifteen years ago was not going to provide enough utility for them to want to bother with it. Now, when for the sort-of-accessible consumer price of a couple hundred dollars, you can put a significant amount of computing power and a significant amount of storage there, I think that makes the picture very different.

What about generic but somewhat specialized stuff like compression and graphics accelerators and stuff like that? Where do you see that stuff going?

Graphics acceleration is an interesting phenomenon, because the technology's certainly been there for a long time. There were some companies that tried very hard to sell graphics accelerators in the days before Windows, and could never make a decent business of it because every application program that had a graphical interface needed its own driver written for every single accelerator.

For the Mac it was easier because it was more standard?

Well, the Mac has never really had accelerated graphics successfully, because what's built into the system has been adequate for most people. But in the PC space, people did try to build these accelerators, but it ended up being an accelerator for AutoCAD, not really a general-purpose accelerator.

Windows completely changed the world from the graphics point of view, because now you can build any arbitrary piece of graphics hardware, and you just write a Windows driver for it, and then all the applications talk to Windows, so it immediately works with every Windows application.

That's spawned an enormous business in graphics accelerators, and I think for the next few years that will continue. Ironically, though, I think that's a short-term business. The reason it goes away is that as processors get faster, if you just have an intelligently architected system—like not a VGA controller, and not an ISA bus, but just a simple frame buffer, just a memory that has one bit for every dot on the screen, and you just provide a fast direct connection between the processor and that memory—you're going to be able to do graphics that are essentially instant from the user's point of view, all in software, so there's going to be no value in having a hardware accelerator.

Maybe a hardware accelerator for things like 3-D rendering would then make sense. It would be a different class of accelerator, but today's accelerators will be obsolete once processors move through another couple of generations. Certainly as you look toward the end of the decade, the accelerator business as it exists today goes away.

To some degree the same thing will happen with compression. We're at a point in the evolution of processors now where you can do some compression in software with reasonable performance. You can even do video compression and decompression all in software, like the Indeo video, but it's ugly.

So people who want reasonable quality video today will pay for a hardware compression or decompression chip. People that want something that's sort of acceptable but cheap will go ahead and use the pure software solution. With another couple generations of processor technology, that pure software solution is going to be delivering to you broadcast-TV-quality video, and relatively few people are going to be willing to pay for extra hardware to move it up a notch.

I think it's sort of an interesting period of time. This next five years will be the heyday of things like graphics accelerators and compression chips, but in the long term they're either going to have to find a yet more complex task that still remains a step beyond what you can do in software with acceptable performance, or they're going to have to find a different business. ■

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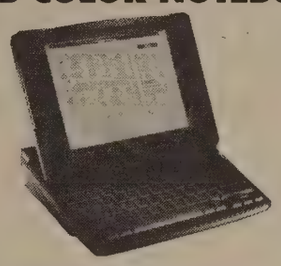

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- 120MB Hard Disk
- VGA Card 16 Bit
- Mini Tower Case & 200W Power Supply
- 2MB Installed
- 16 Bit 1:1 H&F Controller (IDE)
- 1.2 Floppy Drive
- AT I/O, 2 Serial , 1 Parallel, 1 Game Port
- VGA Monitor
- 101 Enhanced Keyboard
- DOS 6.0 w/Manuals

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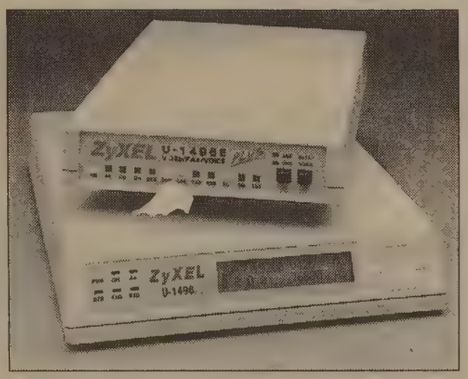

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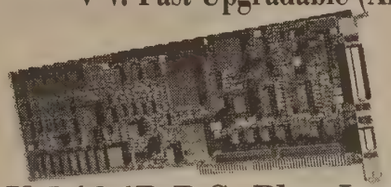

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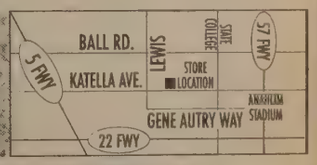

continued from page 27

nil—so much so that *no* additional funds were authorized to implement this service.

This may be the first example of positive net power, but it *won't* be the last!

IT'S THE LAW—AB1624 TEXT

These are the key parts of AB1624 as it was signed into law (necessarily hand-rekeyed for the last time!; bracketed notes are mine):

"Section 10248 is added to the Government Code, to read:

"10248. (a) The Legislative Counsel [who operates the Legislative Data Center] shall, with the advice of the Assembly Committee on Rules and the Senate Committee on Rules, make all of the following information available to the public in electronic form:

"(1) The legislative calendar, the schedule of legislative committee hearings, a list of matters pending on the floors of both houses of the Legislature, and a list of the committees of the Legislature and their members.

"(2) The text of each bill introduced in each current legislative session, including each amended, enrolled [passed by the Legislature] and chaptered [signed or passed into law] form of each bill.

"(3) The bill history of each bill introduced and amended in each current legislative session [a session is two years; some bills are completed in one year, like AB1624; others are "two-year bills"].

"(4) The bill status of each bill introduced and amended in each current legislative session [about five thousand bills are introduced in a two-year legislative session].

"(5) All bill analyses prepared by legislative committees in connection with each bill in each current legislative session. [Partisan analyses by party caucuses are sometimes more important, but are apparently *not* included.]

"(6) All vote information concerning each bill in each current legislative session.

"(7) Any veto message concerning a bill in each current legislative session [if a Governor vetoes a bill, he or she usually explains why].

"(8) The California Codes [the state's laws or statutes; previously sold on magtape for over $200,000 per copy].

"(9) The California Constitution [which includes enacted ballot initiatives].

"(10) All statutes enacted on or after January 1, 1993 [this is essentially redundant with (8), but assures continuing updates of the codes].

"(b) The information identified in subdivision (a) shall be made available to the public by means of access by way of the largest nonproprietary, nonprofit cooperative public computer network [i.e., via the Internet, which in turn is gatewayed to Fidonet, Delphi, GEnie, America Online, CompuServe, etc.].

"The information shall be made available in one or more formats and by one or more means in order to provide the greatest feasible access to the general public in this state.

"Any person who accesses the information may access all or any part of the information.

"The information may also be made available by any other means of access that would facilitate public access to the information [appears to *clearly* authorize independent BBS and computer-host operators to systematically copy all information, continuously update their files, and offer access and value-added options, limited only by the imagination!].

"The information that is maintained in the legislative information system that is operated and maintained by the Legislative Counsel shall be made available in the shortest feasible time after the information is available in the information system [the Legislature's $25-million internal system used by staff throughout the Capitol and in legislators' district offices].

"The information that is not maintained in the information system shall be made available in the shortest feasible time after it is available to the Legislative Counsel. [Delays in data becoming "available" on the internal system has been a problem in the past; activists will monitor it.]

"(c) Any documentation that describes the electronic digital formats of the information identified in subdivision (a) and is available to the public shall be made available by means of access by way of the computer network specified in subdivision (b).

"(d) Personal information concerning a person who accesses the information may be maintained only for the purpose of providing service to that person.

"(e) **No fee or other charge may be imposed by the Legislative Counsel as a condition of accessing the information** that is accessible by way of the computer network specified in subdivision (b) [boldface added].

"(f) The electronic public access provided by way of the computer network specified in subdivision (b) shall be in addition to other electronic or print distribution of the information [to state the obvious].

"(g) No action taken pursuant to this section shall be deemed to alter or relinquish any copyright or other proprietary interest or entitlement of the State of California relating to any of the information made available pursuant to this section." [Some Sacramento powerhogs actually propose that records about legislation-in-process might be public, but are nonetheless exclusive property of the Legislature!]

AB1624 will permit access to legislative details in time to participate in the process of our governance—not just gripe about the results, after the fact.

SPREAD THE WORD

And send yer comments to me at 345 Swett Road, Woodside, CA 94062 or email to jwarren@well.sf.ca.us. ■

Warren founded InfoWorld, *Wireless Digital, Initiative, Inc., and one of the nation's largest public microcomputer conventions. He was founding host of PBS's* Computer Chronicles, *founding editor of* Dr. Dobb's Journal, *and has chaired various trade and professionals' organizations. He holds graduate degrees in computing (Stanford), medical information science (UC Medical Center), and mathematics & statistics. He has been a computer professional since 1968, and was a mathematics teacher and professor for ten years before that.*

He organized and chaired the landmark First Conference on Computers, Freedom & Privacy (1991), was one of the first to receive the Electronic Frontier Foundation Pioneer Award (1992), and led the recent successful effort to make state legislation available via the public nets without state charge. He is a member of the board of directors of Autodesk, Inc.

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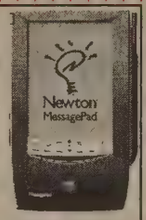

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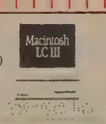

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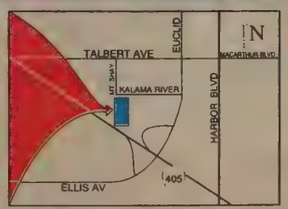

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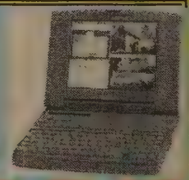

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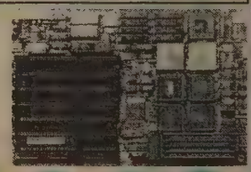

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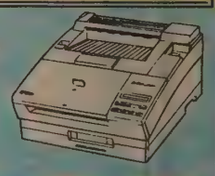

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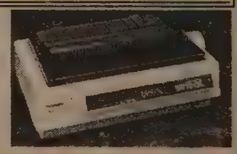

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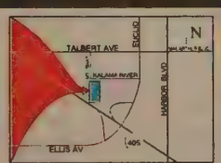

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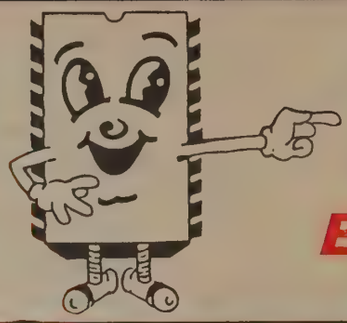

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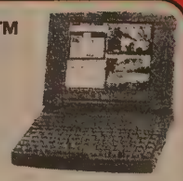

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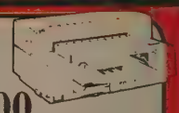

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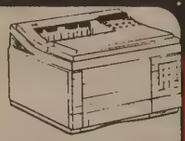

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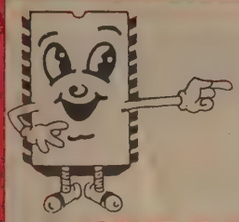

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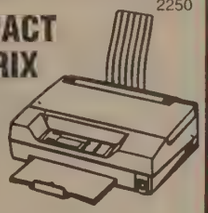

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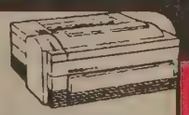

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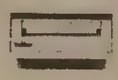

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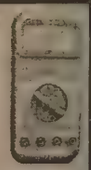

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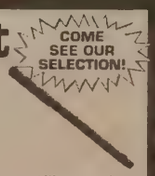

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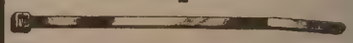

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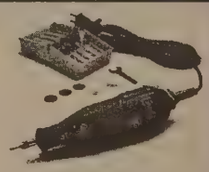

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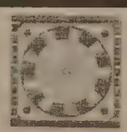

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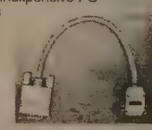

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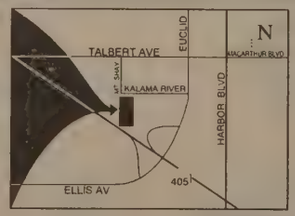

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Skokie, IL 60076-2999
1-800-342-5877

WinFax PRO (Version 3.0: $129, $49 upgrade from WinFax LITE DosFax PRO, Version 2.0: $79, $49 upgrade from DosFax LITE)
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Ste. 240
San Jose, CA 95119-1353
1-800-268-6082

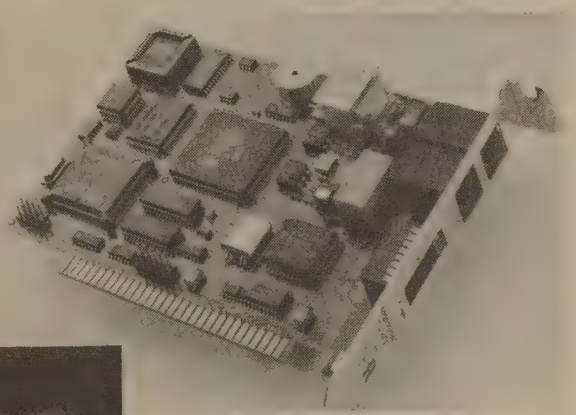
You enjoy logging onto the Internet or a local Bulletin Board System, but hate how slowly your 2400 baud modem displays text on the screen. Or perhaps you are not yet online, because the task of learning to deal with a modem keeps you from making the move. Take heart. Increased modem capability, falling prices, evolving data transmission standards, the proliferation of fax modem capabilities, and a burgeoning cohort of online computer users have combined to make personal telecommunications a much more attractive proposition.

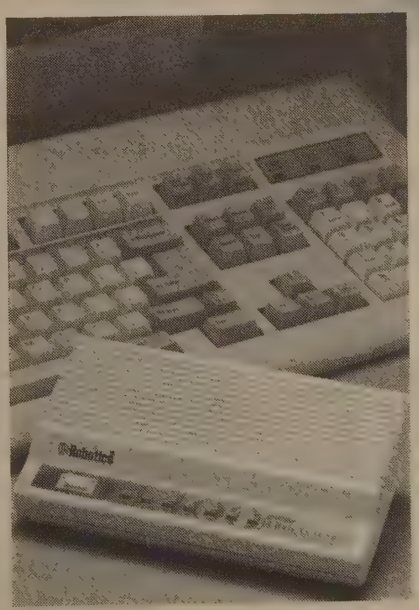
As usual, advancing technology leads the parade, this time in the form of inexpensive 14,400 baud fax modems. Like most modem hackers, I have been eyeing the 14.4, or "fourteen-fours," for some time. At more than $350, however, they were too expensive. I resolved to have a look when street prices dropped below $200. Tracking the possibilities at a local computer supermarket, I spotted a US Robotics Sportster 14,400 baud fax modem. Its specs were impressive, the price was right, and it came in a handsome box. The Sportster proved to be an appropriate choice, since US Robotics is the well-established firm which kicked off a major expansion in the market for high-speed modems by dropping its prices dramatically last spring. Competitors followed suit, resulting in across the board price reductions of one third to one half.

REVOLUTIONARY TELECOMMUNICATIONS

The increased capability of the fourteen-fours over the previous generation's standard at 2400 baud can appropriately be called revolutionary. A look at the capabilities of the new package shows why.

Suppose you are reading text while online to your local BBS. At 2400 baud, it takes about six seconds to write a 25 x 80 screen. At 14,400 baud, the write takes less than a second. For me, waiting six seconds while the screen fills results in irritating fatigue after a very short stint at the





console. At 14,400 baud, the wait is barely noticeable. I am now able to read netmail from old friends, participate in public computer forums, peruse an online encyclopedia, or converse in real-time text, all with the speed and comfort I associate with word processing on my own computer.

Now, suppose you are downloading graphical image format (GIF) display images from the Internet. At 2400 baud, using the Zmodem protocol, approximately 260 bytes are transmitted per second, fewer than 15K bytes per minute. At this rate it takes about ten minutes to transfer a 150K file, a typical size for a GIF image. At 14,400 baud, the same picture can be downloaded in a minute and forty seconds. The additional speed saves money, especially if you are paying message units to connect.

Until the recent price break, there was some question whether modem purchasers should choose a 14,400 baud unit or settle for 9600 baud. That question has been resolved in favor of the fourteen-fours. Because the price difference between the two models has rapidly disappeared, 9600 baud modems have practically been driven from the market. Sysops are skipping 9600 baud and buying fourteen-fours for their BBSes. CompuServe still utilizes 9600 baud modems, but plans to move up to 14,400 baud soon. In any case, the fourteen-fours adjust seamlessly to the lower speed, as they do to all standard lower baud rates. If you choose a 9600 baud unit now, you will only limit your speed in the future.

THE SPORTSTER CAN ALSO FAX

The Sportster's fax handling capabilities were truly a revelation to me. The unit

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comes with a package called WinFax LITE, by Delrina Technology. You can install WinFax as a Microsoft Windows printer driver. Then, when you print from your Windows word processor, WinFax prompts for a phone number, dials, and transmits the document as a fax. WinFax receives faxes, either upon command or in background mode, and allows you to view, modify, and annotate them, as well. It also allows reception of faxes when running standalone DOS applications.

The increased capability of the fourteen-fours over the previous generation's standard at 2400 baud can appropriately be called revolutionary.

A companion program, DosFax, provides many of WinFax's capabilities, but runs under DOS rather than Windows. WinFax and DosFax can both be configured to operate with most fax modems. Both programs require a fast processor, many megabytes of disk space, and a VGA video system. I am running WinFax on a 486 and find it fast enough; a 386 system might be adequate, and a 286 too slow.

Be aware that stored faxes are disk hogs. A page of text which would occupy 3.5K bytes as ASCII characters, requires 45K to store as a fax image. Not to worry. For $50 you can upgrade to WinFax PRO, which offers an optical character recognition (OCR) capability that translates fax text images to ASCII, or to a chosen word processor format. Better still, if you have access to a fax machine or scanner, the Sportster/WinFax combo becomes a poor man's OCR system. I faxed a laser printed document, in a ten point Times Roman font, from work to home. The OCR program successfully converted all but twenty of its three thousand characters. The paperless office may never be achieved, but with such capabilities, we are certainly a big step closer.

Utilization of fax has proliferated, in part because fax provides universal standards which allow nearly hands-off operation. The spread of PC data communications, however, has been hampered by the lack of a single standard. This situation is improving somewhat, although we still have a way to go. The CCITT V.32 bis and V.42 bis standards (the buzzwords to remember) specify the physical transmission of data at 14,400 baud, with error control, and increased throughput speed achieved by data compression. In conjunction with the Zmodem data transmission standard, they are as transparent as fax. To download a file from the Internet, I simply type sz filename<ENTER>. Procomm, my communications software, is smart enough to detect the incoming transmission, begin reception, and monitor the transfer to completion, all without operator intervention. Zmodem, which is gaining widespread acceptance because of its convenience, is, however, only one of many "standards," including Kermit, Xmodem, Ymodem, ASCII, etc., each with its own requirements and idiosyncrasies.

SPORTSTER'S PERFORMANCE

The Sportster performed well. It seems resistant to the typical noise of a local telephone circuit. I tried the unit with several bulletin boards, as well as my Internet service, and had few problems reading and writing text. Downloading large files from the Internet has proven reliable, but uploading seems prone to communication errors, which Zmodem corrects by retransmission. I also tried the Sportster on our PBX telephone system at work. A friend with a Macintosh PowerBook running Smartcom II and a Supra modem called Procomm on my PC via the Sportster. Procomm responded and we were able to transmit text to each other's screens at 14,400 baud once we realized that the Mac and PC require different line terminators.

You will need to configure the Sportster (or any modem, for that matter) to your communication software and your computer, by setting switches and choosing initialization sequences. This task has become more complicated as modems have become

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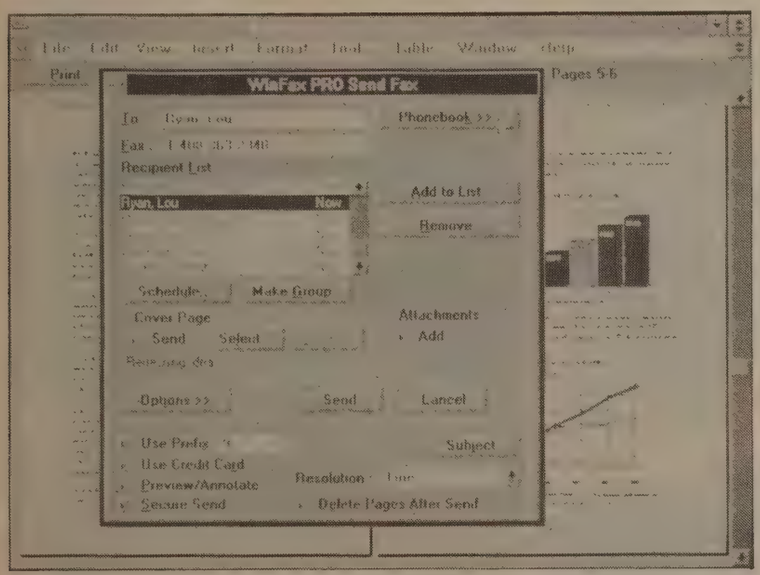
more capable. US Robotics, however, provides a helpful booklet which gives specific directions for connecting the Sportster to more than a dozen communication software packages. Installation took me about a half hour. Configuring the external version was straightforward since I had a spare RS-232 port available. Installing the internal modem, however, was complicated by a need to select appropriate PC interrupt vectors and set jumpers accordingly on the modem board. If you don't feel like dealing with such problems, buy the modem and the communications software from a vendor who is willing to handle installation. When buying a new computer, do not fail to include a modem. (If cost is a problem, 2400 baud units with send fax capability are available for as little as fifty dollars.)



WinFax, included with the Sportster Fax/Modem, prompts you for a phone number, dials, and smoothly transmits your documents as a fax.

When purchasing a fast modem, it is important to choose a manufacturer, like US Robotics, with lots of experience. High-speed data transmission over voice grade telephone lines is a smoke and mirrors business. While most manufacturers of 14,400 baud modems meet the requirements of V.32 bis and V.42 bis, they each do it in a slightly different fashion, especially regarding line noise handling. This can make it difficult for modems from different manufacturers to communicate with each other on noisy lines. In this game, experience yields reliability—a word to the wise.

THE FUTURE IS HERE

For many years, the so-called telecommunications revolution has been just around the corner, but it never seemed to arrive. Now, with the advent of inexpensive 14,400 FAX modems, the long-awaited explosion in personal computer telecommunications may at last be about to detonate. ■

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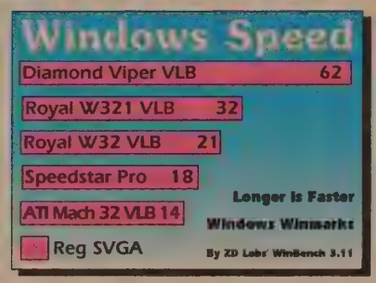

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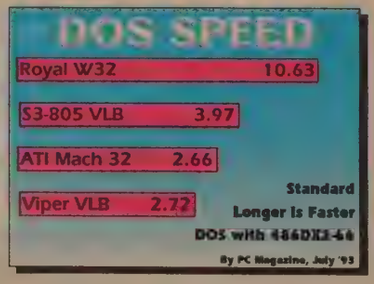

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IBM 486 DLC/66 MHz OK No ZIF.....$1270
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IBM SLC 66MHz 3-VLB w/256K & CPU & Math Co.	420
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ISA 386 40MHz w/64K & CPU	130
ISA 486 25MHz SX w/CPU	180
ISA 486 33MHz SX w/CPU	195
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ISA 486 50MHz DX2 w/64K & CPU	445
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DTC 3290 EISA SCSI II Exp to 4MB	360
DTC 3270 VLB SCSI 2	105
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CTX 1560/1560LR 15" 1024 x 768	385/395
CTX 1561/1561LR 15" 1024 x 768	365/375
CTX 1760F/1760LR 17" 1024 x 768	780/790
KFC 15" Digital Monitor 1280x1024	395
KFC 17" (1280x1024)	770
Mag 1564 15"	370
Mag 15F 15"	485
Mag 17F 17"	880
NEC 3FGE 15"	625
NEC 4FGE 15"	730
NEC 5FGE 17"	1125
NEC 6FG 20"	2325
Sony CDD 1430 14" NI	595
Sony CDD 1730 17"	1045
Sony GDM 2036 20"	1995
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View Sonic 6E 14"	285
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View Sonic 17 76Hz .28	1010
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Panasonic CR-532 Int. SCSI 290ms	310
Panasonic CR-562B Int. D-Spin 290ms	290
Sony 31A Int./Ext. AT Bus w/Int. Card 490ms	160/295
Sony 31A-03 w/Int. Card 390ms	210
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Toshiba 3401B Int. SCSI 200ms	375

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Microsoft Serial/Bus Mouse	50/65
Royal 3 Button Mouse 1450 DPI	Call
Zenix Cordless Mouse w/Windows 3.1	**55**

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Conner 250 MB Tape Cartridges	22
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Syquest 105 MB IDE/SCSI Removable Drive	410/430
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Trakker 250 Ext.	350

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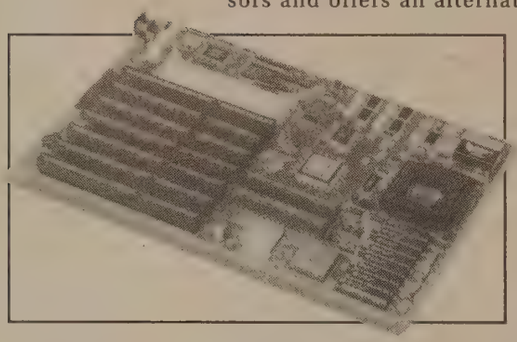
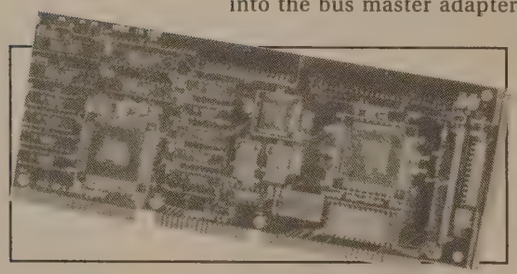
The Cougar motherboards are based on IBM's new Blue Lightning family of 486 compatible processors and offers an alternative to Intel 486- and Pentium-based products. Alaris designed the Cougar products in close cooperation with IBM to optimize the clock tripling performance of the Blue Lightning processors, in both the 25/75MHz and 33/100MHz versions. In addition, Blue Lightning features 16K of internal cache, twice the amount offered by Intel's 486 processor. It also conserves energy by operating at 3.6V, eliminating the potential for excess heat build-up. This reduction in overall power consumption can increase the reliability and life span of the product. (Cougar 25/75, $599) Alaris, Inc., 46704 Fremont Blvd., Fremont, CA 94538. (510)770-5700.



FOREX FR600AF VL BUSMASTER

The FR600AF VL BusMaster is a 32-bit bus mastering VESA SCSI host adapter. Unique features integrated into the bus master adapter include the combination of the high-speed SRAM and board level protocol providing nearly 30% increase in Data Transfer Rate (DTR) at the same CPU speed, especially in CAD/CAM and UNIX environments. Offering auto adjusting, the Forex FR600AF allows a drive to be moved or reconnected to a new system without having to be reformatted each time. Also, it supports many drives including hard disk, CD-ROM, removable media storage peripherals, magneto-optical systems, WORM, tape, and DAT. True to the SCSI standard, this VESA adapter lets you work with up to seven daisy-chained storage devices. ($240) Forex Computer Corp., 2121 Ringwood Ave., San Jose, CA 95131. (408)955-9280.



UPDATES

✥ **Aldus** released **Aldus Fetch 1.2**, an upgrade to its multiuser, mixed-media database program for the Apple Macintosh. Registered owners of Fetch 1.0 can obtain the 1.2 upgrade for free. Aldus Corp., 411 First Ave. S, Seattle, WA 98104-2871. (206)398-8819.

✥ **Baarns Consulting** announced **The Baarns Utilities 2.0 for Microsoft Excel**, which adds nine completely new utility programs and hundreds of modifications to the initial fourteen utilities. Several of the original utility programs have also been completely redesigned for added functionality. Baarns Consulting Group, Inc., 12807 Borden Ave., Sylmar, CA 91342. 1-800-377-9235.

✥ **Intuit** announced **Quicken 3 for Windows**, which features, in addition to Quicken's traditional checkbook metaphor, a new user interface designed around a paper calendar. Upgrades are available directly from Intuit for $29.95 plus $5 shipping and handling. Current users can purchase Quicken 3 through retail outlets for a $10 in-box rebate. New users receive a $5 in-box rebate. Intuit Corp., PO Box 3014, Menlo Park, CA 94026-3014. 1-800-624-8742.

✥ **Lotus** announced **Lotus cc:Mail Group Pack**, which combines their electronic mail system with the group scheduling version of Lotus Organizer personal information manager (PIM). cc:Mail Group Pack is an entry-level one-box messaging system for small businesses and workgroups in larger organizations. The suggested retail price is $845. Lotus Development Corp., 55 Cambridge Parkway, Cambridge, MA 02142.

✥ **Magic Software Enterprises** introduced **Magic 5.5**, the latest version of the company's rapid application development (RAD) tool for client/server host environments. Magic 5.5 supports concurrent, multiuser development and also features support for embedded structured query language (SQL). Magic Software Enterprises, 1200 Main St., Irvine, CA 92714. (714)250-1718.

✥ **Magic Software Enterprises** also introduced new **MagicGate** database gateways for Oracle, Sybase, and Rdb relational database management systems (RDBMSes). Users of MagicGate can create Magic 5.5 applications that access a variety of data files, regardless of their structure or location in the computing environment, and access multiple data sources within the same application. Magic Software Enterprises, 1200 Main St., Irvine, CA 92714. (714)250-1718.

✥ **NewGen** offers a **PCL5 upgrade** for its laser printers that extends their ability to work in office environments that require PCL5 and computer-aided design applications utilizing the HPGL/2 graphics/plotter language. The upgrade consists of a memory card that can be inserted into one of the built-in memory slots on NewGen printers and costs $199. NewGen Systems Corp., 17550 Newhope St., Fountain Valley, CA 92708. (714)641-8600.

✥ **Powercore** released **Network Scheduler 3 v2**, which provides workgroups with a single source for calendaring/scheduling that is independent of computer platform, network operating system, and messaging system. Powercore Intl. Inc., P.O. Box 756, Manteno, IL 60950-0756. 1-800-237-4754.

✥ **Shapeware** announced **Visio 2.0**, the latest version of its drag and drop drawing program for business professionals. Registered users of Visio 1.0 can upgrade to Visio 2.0 for $79. Shapeware Corp., 1601 Fifth Ave., Suite 800, Seattle, WA 98101-1625. 1-800-446-3335.

✥ **Sybase** released **Gain Momentum 2.0**, an interactive information delivery system which combines the rich context of multimedia with the flexibility of client/server computing. The product consists of visual development tools; GEL, a fourth generation language (4GL); an application/object store; and a suite of multimedia editors. Current Gain Momentum customers will receive the 2.0 version automatically under their maintenance agreements. Sybase, Inc., 6475 Christie Ave., Emeryville, CA 94608. (510)658-9441.

✥ **TRUMATCH** released **ColorPrinter Software v3.0**, which includes support for color management technologies **Apple ColorSync** and **EfiColor** by Electronics for Imaging. TRUMATCH, Inc., 25 W. 43rd St., Suite 802, New York, NY 10036. 1-800-878-9100.

✥ **UniPress** announces **Microsoft LAN Manager v2.2 For Sun**, which will allow Sun workstations to act as servers for PC client applications on MS-DOS, Windows, Windows NT, Windows for Workgroups, and OS/2 platforms. UniPress Software, Inc., 2025 Lincoln Hwy., Edison, NJ 08817. (908)287-2100.

✥ **WordPerfect** and **Borland** have bundled **WordPerfect 6.0 for Windows** with **Quattro Pro 5.0 Workgroup Edition** in specially marked packages. Current users of WordPerfect can upgrade to WordPerfect 6.0 for Windows with Quattro Pro 5.0 Workgroup Edition for $150. A competitive upgrade for this promotion is available for $170 from any DOS, Windows, or OS/2 word processor that has a retail price of at least $395. WordPerfect Corp., 1555 N. Technology Way, Orem, Utah 84057-2399. (801)225-5000.

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486DX-33MHz $2019
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- 32 Bit VLB IDE with I/O (2S/1P/1G)
- 127MB IDE Hard Drive
- Mini Tower Case w/200W Power Supply
- 32 Bit Diamond Speedstar Pro VLB w/1MB
- 14" CTX Super VGA Monitor .28dp
- 101 Key Enhanced Keyboard
- Mouse

486DX-33MHz $1299
486DX2-66MHz $1549

486 ISA Win Station

- 4MB (70ns) RAM & 256K Cache
- 1.2MB Floppy Drive
- 1.44MB Floppy Drive
- IDE with I/O (2S/1P/1G)
- 127MB IDE Hard Drive
- Mini Tower Case w/200W Power Supply
- Trident 8900CL SVGA w/1MB
- 14" CTX Super VGA Monitor .28dp
- 101 Key Enhanced Keyboard
- Mouse

486DX-33MHz $1189
486DX-50MHz $1329
486DX2-66MHz $1399

486 MultiMedia System

- 4MB (70ns) RAM & 128K Cache (0K in SX)
- 1.2MB Floppy Drive
- 1.44MB Floppy Drive
- IDE with I/O (2S/1P/1G)
- 127MB IDE Hard Drive
- MultiMedia Desktop Case w/Speaker Built-in
- 16 Bit Super VGA Card with 1MB
- 14" CTX Super VGA Monitor .28dp
- 101 Key Enhanced Keyboard
- Mitsumi CD-ROM 280ms
- * Sound Blaster Pro Delux

486SX-25MHz $1199
486SX-33MHz $1359

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ARCNET 8 PORTS ACTIVE HUB, COAX	99
ARCNET 8 PORTS ACTIVE HUB, TWISTED PAIR	145
ARCNET 4 PORTS PASSIVE HUB	15
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16 BIT ENET, COAX	55
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16 BIT ENET 2000PLUS (RJ-45/BNC/AUI) JUMPERLESS	82
32 BIT EISA ENET (AUI/BNC/TP) 3-in-1	215
10-B-T 8 BIT ENET NE1000 COMPATIBLE	49
10-B-T 16 BIT ENET NE2000 COMPATIBLE	55
D-LINK 16 BIT 10-B-T OR BNC ENET (OEM)	72
D-LINK 16 BIT ENET COMBO (OEM)	175
D-LINK 32 BIT VESA LOCAL BUS ENET	365
SMC 16 BIT ETHERNET CARD COAX	139
SMC 16 BIT ETHERNET CARD 10-B-T	139
EAGLE TECHNOLOGY NE2000PLUS ENET	145
EAGLE TECHNOLOGY NE2000PLUS-3 ENET	165
EAGLE TECHNOLOGY NE2000T PLUS ENET 10BT	135
EAGLE TECHNOLOGY NE3200 EISA 32 BIT ENET	670
3COM 3C503 ETHERLINK II	185
3COM 3C503 ETHERLINK II 16 TP	205
3COM 3C501 ETHERLINK	310
3COM 3C509 ETHERLINK III 16 BIT BNC	130
3COM 3C509 ETHERLINK III 10BT TP	130
ARTISOFT LANTASTIC/AI V 5.0 FOR DOS	79
ARTISOFT LANTASTIC/AI V 5.0 FOR WINDOW	89
ARTISOFT LANTASTIC V 5.0 AE-2 STARTER KITS	535
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ARTISOFT LANTASTIC AE-3 ADAPTER 10 BASE T	249
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NOVELL NETWARE 386 V.3.12 10-USER DSK5	1195
NOVELL NETWARE 386 V.3.12 25-USER DSK5	1795
NOVELL NETWARE 386 V.3.12 50-USER DSK5	2355
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SMARTLINK (GATEWAY 2000 OEM) 14400/14400 FAX MODEM INT./EXT.	160/190
SMARTLINK (GATEWAY 2000 OEM) 2400 MODEM INT./EXT.	35/55
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COLORADO JT-10 JUMBO TRAKKER 120MB (PARALLEL) TAPE DRIVE	299
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COLORADO DJ-20 JUMBO 250MB TAPE BACKUP	179
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MAYNARD ARCHIVE VIPER 525MB SCSI TAPE DRIVE INT./EXT.	495/955
6 PORTS ETHERNET CONCENTRATOR 1 BNC/6 RJ-45	215
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MB486SX-25/0K UP TO 32MB	175
MB486SX-33/0K UP TO 32MB	215
MB486DX-33/256K up to 32MB	399
VLB MB486DX-33/256K 2 VLB/ZIF	418
VLB MB486DX-33/256K 3 VLB/ZIF	430
EVLB MB486DX-33/256K 2EVLB/6 EISA/ZIF	560
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• DX2-50 cpu	Add 110
• DX-50 cpu	Add 140
• DX2-66 cpu	Add 220
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EISA MB486DX-33 256K ICP/E3	815
EISA MB486DX2-50/256K ICP/E3	1085
EISA MB486DX-50/256K ICP/E3	1095
EISA MB 486DX2-66/256K ICP/E3	1165
VESA LB 486DX-33/256K VCPL	645
VESA LB 486DX2-50/256K VCPL	815
VESA LB 486DX2-66/256K VCPL	1045
VESA LB 486SX-25/256K VCPL	315
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EISA VESA LB 486DX-33/256K	955
EISA VESA LB 486DX2-50/256K	1155
EISA VESA LB 486DX2-66/256K	1345

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CONNER 80MB/17MS IDE	160
CONNER 170MB/17MS IDE	195
CONNER 250MB/14MS/64K IDE	239
CONNER 520MB/12MS/256K IDE	550
CONNER 520MB/12MS/256K SCSI-2	559
WD 212MB/13MS IDE	215
WD 250MB/13MS IDE	235
WD 340MB/13MS IDE	290
WD 420MB/13MS IDE	390
MAXTOR 130MB/15MS IDE	179
MAXTOR 213MB/15MS IDE	225
MAXTOR 245MB/15MS IDE/SCSI	245/289
MAXTOR 340MB/13MS IDE/SCSI	309/360
MAXTOR 540MB/13MS IDE SCSI-II (3.5")	750/750
QUANTUM 127MB IDE	180
QUANTUM 240MB IDE	235
QUANTUM 525MB/10MS IDE/SCSI-II	550/555
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QUANTUM 1.2GB/10MS SCSI-II	1010
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TOSHIBA 870MB/12.5MS SCSI II	799
TOSHIBA 1.05GB/12MS/SCSI II	879
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CTX 1760F/LR 17" SVGA 1280x1024 .28DP N.I.	695/715
NEC3FGE 15" FLAT (.28) 1024x768	610
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MAG MX15F 1280 X 1024 .28 N.I. DIGITAL, LOW RAD.	**499**
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VIEWSONIC 7 17" .28DP 1280 X 1024 LOW RAD., FLAT	808
VIEWSONIC 17 17" .27DP 1600 X 1280 NI., 76Hz, LOW RAD., FLAT	975
VIEWSONIC 20 20" .28DP 1600 X 1280 NI., 76Hz, LOW RAD.,	1655
VIEWSONIC 21 21" .25DP 1600 X 1280 NI, 76Hz, LOW RAD, FLAT	1885

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Promise-2000VL VLB 32BIT IDE/IO Cntrl, 50MHz up to 4MB/Sec	39
Adaptec 1542C SCSI Ctrl Card	205
Adaptec 1542CK SCSI Ctrl w/Novell S/W (Bus Master)	255
Adaptec 2742T EISA SCSI-II Ctrl (Bare)	360
Adaptec 2742TK EISA SCSI-II Ctrl w/Novell S/W (Bus Master)	410
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Ultrastor 14F ISA SCSI Ctrl, 32K Cache Buffer	205
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Ultrastor 34FK U34F w/Drivers	349
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DTC 3290HD EISA SCSI Caching Ctrl, (0K up to 4MB)	437
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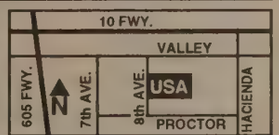

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PRODUCT SPOTLIGHT

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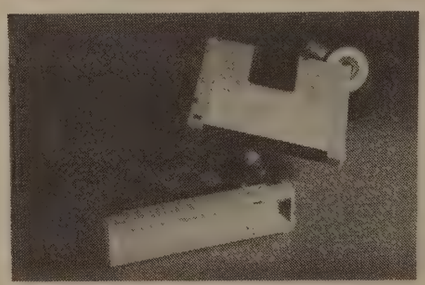
The Fax Authority line of personal and shared computer facsimile processors is available in three versions: Solo, for home or personal use; Office, for workgroups or small networks; and LAN, for local and wide area Novell Ethernet networks. Slightly larger than a conventional modem, each Fax Authority is a self-contained, facsimile processor that connects to, but works independently of, the user's PC. It monitors the data stream from the PC to the printer, captures outgoing fax documents, converts them to facsimile format, and transmits them to any Group III fax machine around the block or around the world. With its built-in buffer memory, the Fax Authority can send, receive, store, or automatically print incoming faxes even when the user's PC is off. It can also store outgoing faxes for transmission at a specified time. (Fax Authority, Solo, $595; Office, $895; LAN, $995) ASP Computer Products, Inc., 160 San Gabriel Dr., Sunnyvale, CA 94086. (408)746-2965.

MONITOR SAVER

The Monitor Saver, by Cypress Computer, exceeds the new EPA Energy Star Program guidelines that stipulate 30 watt maximum electricity for the monitor when it is inactive. The Monitor Savor uses only 0.001 watt and works in any voltage from 110V to 240V. Designed for IBM XT/AT PC and compatibles, it monitors keyboard activity and automatically turns off the power of the monitor when the keyboard is left idle for a specified time. The idle time can be set anywhere from five to thirty minutes. A keystroke will bring the monitor back on again. ($60) Cypress Computer, Inc., 26120 Eden Landing Rd., Hayward, CA 94545. (510)786-9106.

Valuestor Opto Advantage 128



VALUESTOR OPTO ADVANTAGE 128

Opto Advantage 128, a 3.5", 128MB rewritable disk drive, provides reliable data security, convenient software distribution, archival storage of large files, and immediate access to stored files for IBM compatible, notebook, and laptop computers. It is available as an internal, SCSI external, or external parallel port drive. The internal unit mounts conveniently in any 5.25" or 3.5" drive bay and comes with its own mounting kit. Portable Opto Advantage 128 comes complete, offering ease-of-use for desktop or portable computers. The parallel port interface offers the added ability to share a single drive among different office or home computers. ValueStor also offers 128MB optical disks, backed by a lifetime warranty. (Opto Advantage 128 Internal, $799; Portable Opto Advantage, $999; 128MB Rewritable Optical Disk five-pack, $190) ValueStor, Inc., 105 Serra Way, #443, Milpitas, CA 95035. (408)945-1200.

LAPTOPS

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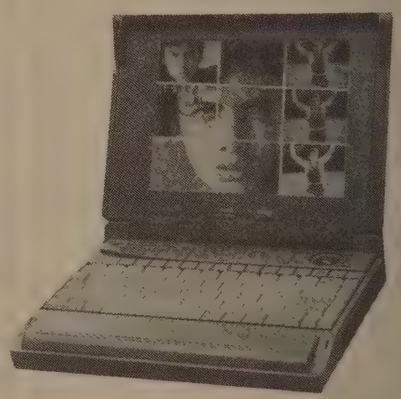

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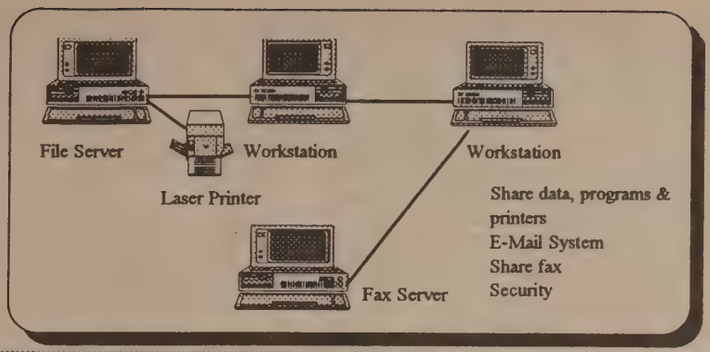

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16 Bit Jumpless BNC (OEM)	$ 55
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16 Bit Jumpless Combo	$ 65
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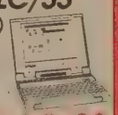

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port for increased system expandability and functionality, and an integrated trackball. The 486-based Bravo NB computers come in monochrome, Dual Scan STN color, and TFT color versions. The system comes standard with 4MB of RAM, expandable to 20MB; one PCMCIA Type III (or Type II) slot; a 3.5", 1.44MB internal floppy disk drive; and an 80MB hard disk drive, expandable up to 170MB. A nickel metal hydride battery gives users up to three-and-a-half hours on the monochrome system and up to three hours on the color models. (Suggested list prices start at $1699 for the monochrome systems; $2499 for Dual Scan STN color; and $3549 for TFT color.) AST Research, Inc., 16215 Alton Pkwy., PO Box 57005, Irvine, CA 92619-7005. 1-800-876-4278.

REVIEWS

GAME REVIEWS

By Mike Markowitz

WARLORDS II

Designed By: Steven Fawkner
Published By: SSG
For: MS-DOS (640K plus 2MB of Extended or Expanded memory, 80386 or higher CPU, VGA graphics, mouse, supports major audio cards)
List Price: $69.95

Graphics and Animation: 9
Sound: 9
User Interface: 8
Overall Value: 9

The original version of Warlords sold over fifty thousand copies, and won several awards. Set in a standard medieval fantasy world of swords and sorcery, Warlords was a deeply addictive game of strategy that required careful planning and provided constant suspense and surprises. Up to eight warlords compete to rule over a vast mythical continent. You win by gaining control of a majority of the cities. Towns produce armies of various kinds, and provide the gold you need to finance the war and recruit new heroes. The time scale is indefinite—a dragon can fly twenty-four leagues in one turn, while typical heavy infantry can only march eight leagues along a road. The map is based on a square grid, but an elegant movement system lets the program plot an optimal path for a selected group when you simply click on a destination.

Warlords II is a complete redesign that offers new options and features. New unit types include elephants, catapults, and Minotaurs. In the original version, fleets were expensive and took a long time to build. Now ships appear automatically when you move armies out to sea from a port or onto a river from a bridge. Mundane realism was not a design objective in Warlords II. For example you can destroy a city, but you cannot destroy a bridge.

The program can randomly generate a new map for each game. You can have most of the map hidden at the beginning of the game, except for a tiny patch around your home village. The lay of the land is only revealed as your units explore it. You need to find a town that breeds giant bats as soon as possible, since they are the cheapest long-range recon units.

I thought it was just me, but several other gamers have told me that they stayed up until ridiculous hours, like 4:30 am, playing Warlords II when they first got the game. I had to delete it from my computer's hard drive, just to get any work done. How can one explain the power of this game to grab you by the throat and keep you up planning, scheming, and marching your armies around, long after sane people have gone to sleep?

Part of the game's appeal is the ability to customize everything. You can rename your heroes, the towns, and even the players. If you don't want to be the Dark Elves you can name your side the Jedi Knights, the Chicago Cubs or anything else that will fit into the text entry box. The program uses Chancery Black, a decorative font with a definite medieval flavor. Much of the game's appeal is the quality of the artificial intelligence that directs your computer-controlled opponents. You can select opponents with different styles and personalities. The diplomatic system recognizes three states: peace, hostility, and war. A state of hostility means you can attack your neighbor's armies, but not his cities. When peace prevails, the cursor turns into a heart rather than a sword, when you move it over the other player's unit. Treachery is always an option, but it makes you unpopular with the other neighbors.

The combat system ensures that the bigger battalions will usually prevail, but there is enough uncertainty to allow the weakest

Continued on page 122

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Product Reviews

Ultra High Performance Local Bus PCs
PCI Local Bus Computer

For those discerning buyers who want the best possible technology coupled with ultra high performance, National Component Distributors sells a range of PCI local bus-based machines at very competitive prices. The PCI local bus designed and marketed by Intel is supposed to be the high-end local bus choice. It is supposed to be the high-end local bus choice. It is more technically sound and elegant than the VESA local bus and overcomes the 3 peripheral limit, even though the latter is cheaper and offers equivalent performance in current designs.

Systems LAB rosted one of the NCD PCI machines based on the 486 DX2 66MHz CPU. The machine came with a 500Mb SCSI Scagate 3600N disk Drive, an S3 local bus accelerated video card, 16 Mb of high speed RAM and a 486DX2-66 MHz processor mounted in a P24T (Pentuim Overdrive) upgradeable Zero Insertion Force (ZIF) socket. Three PCI slots were available on the motherboard, one of which was used for the local bus video card. In line with Intel recommendations, a whisper fan was mounted on top of the 486 processor in order to dissipate as much heat as possible.

Unlike VESA slots, which reside behind normat ISA slots are mounted in a seperate bank on one side of the motherboard. The NCR SCSI controller, which is also a local bus device, is integrated directly onto the motherboard of the NCD machine.

Unfortunately, because it is a very recent introduction to the SCSI controller market, the NCR 510 SCSI chip is not yet supported by operating systems such as OS/2 2.1 and Windows NT although drivers for both will be available shortly. However all DOS and Windows versions, and all OS/2 versions prior to version 2.1 are supported.

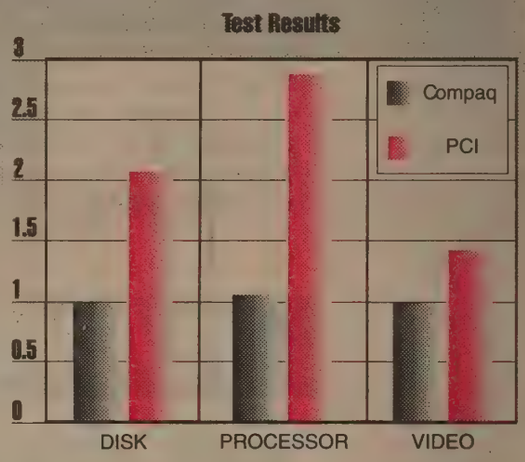
Performance of the NCD machine is astonishing. It is one of the fastest machines that Systems LAB has ever tested. Although its CPU and memory performance figures were average for a 66MHz 486 class machine, the local bus SCSI and video implementation gave exceptional throughout. It easily outperformed our reference 33MHz 386-based Compaq and was significantly faster on disk thoughout than a high-end 486-66MHz Phillips workstation.

The quality of supporting equipment such as casing, power supply, keyboard and screen was acceptable, and a wide range of alternative components are available.

Many manufacturers, especially the high-end brand name vendors, are moving to the PCI specification. Because it is processor independent, it is likely to become a well-accepted industry standard across platforms, with the result that many cheap peripheral cards should become available for it. The NCD range of machines allows you to tap into tomorrow's PCI technology now at an affordable price. With upgradeability to Pentions, and a range of processor options available, this machine is ideal as a high-end workstation or as a server.

Systems LAB benchmarks were executed on the NCD PCI and on a reference 33MHz 386 based Compaq Deskpro /331. The Compaq had an 80Mb hard disk drive and the QVision graphics sub-system. Disk performance of the NCD was hindered by the SCSI overhead on the small records test, but when larger records were used, the advantage of the PCI bus and the fast hard drive became evident. The memory and CPU performance of the NCD were clearly better than the Compaq machine, and even the graphics sub-system was faster than Compaq's high performance video.

Thomas Browne – Editor/PC Magazine, October 1993



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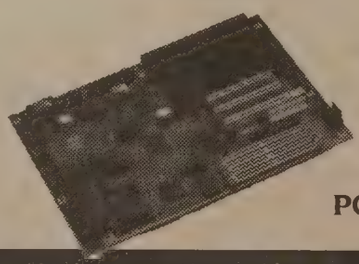

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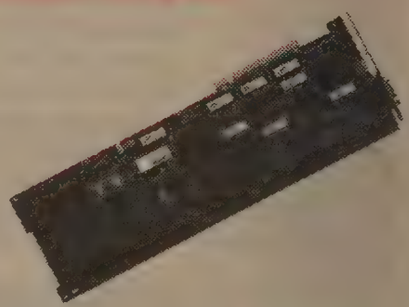

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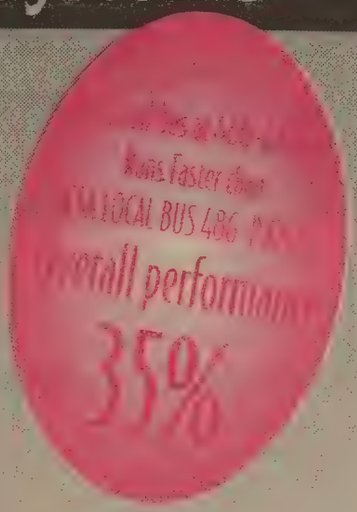

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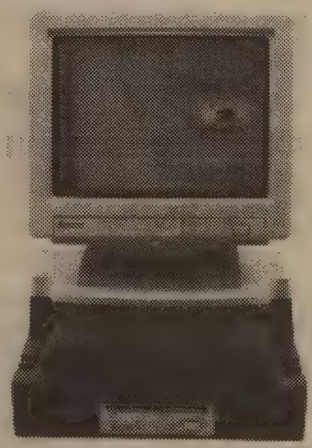

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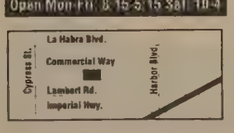

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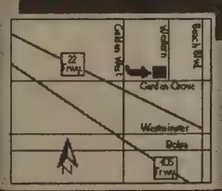

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Continued from page 115

light infantry a small chance to slay the mightiest dragon. There is a complex system of combat bonuses and special effects. Heroes who accumulate enough experience can be promoted, and rare lucky units can be awarded medals, which increase their combat strength. You must constantly decide whether to use your heroes to lead armies, or to send them off exploring ruins in the hope of finding supernatural allies or magical items that will increase their power. A new option is the Quest—a hero who visits a temple can be given an assignment to slay a particular opponent, sack a particular city, or pillage a certain amount of gold. If you complete a Quest there is a large but unpredictable payoff. My opponents usually receive a legion of Archons (angelic flying warriors), but all I got was a lousy tipoff to the hidden location of the Ring of Power.

The game is installed from two high-density 3.5" disks, and takes up about 6MB of hard disk space after installation. There is an illustrated manual and a simple tutorial for new players. The program has a delightful sense of humor, as you will discover when you try to resign from a game.

The only complaint I would make about the user interface is the lack of an Undo feature for unit movement. It is all too easy to click in the wrong place and send an army marching off into a swamp. From time to time the helmeted head of the Warlord himself appears on the screen to comment on your performance. This gets old after awhile, and there is no way to turn him off. (Strategic Studies Group, 8348 Monticello Dr., Pensacola, FL 32514. 904/494-9373. Fax: 904/494-9374)

V FOR VICTORY: GOLD—JUNO—SWORD

Programmed By: Mike Traffanstead
Published By: Three Sixty Pacific
For: MS-DOS (2MB, Super VGA graphics, supports major audio cards); Macintosh (2MB, 256-color graphics)

Next summer will be the fiftieth anniversary of the Allied invasion of Normandy (June 6, 1944), one of the largest and most complex military operations in history. Most American war gamers know very little about the critical role that British and Canadian troops played in this campaign. This is due partly to the controversial reputation of the British commander, Field Marshall Bernard Montgomery, who was considered a national hero by the British and a pompous, incompetent Limey twit by the Americans.

Graphics and Animation: 8
Sound: 8
User Interface: 9
Overall Value: 8

Thanks to excellent planning and a good measure of luck, the initial British and Canadian landings on beaches code-named Gold, Juno, and Sword went very smoothly, but in the following days and weeks there was intense and desperate fighting as Montgomery's forces inched toward the strategic town of Caen, opposed by every soldier, gun, and tank the Germans could scrape up. The unusual terrain of Normandy favored the defender. To shelter their crops from the wind, generations of Norman farmers had constructed "hedgerows," massive earth embankments, thickly planted with shrubbery, turning the landscape into a patchwork of ready-made forts.

This is the situation simulated in Gold—Juno—Sword, the fourth installment in Three Sixty's V for Victory series. This is the definitive World War II tactical game system.

The program requires about 6MB of hard disk space. Documentation is superb, including a thick reference manual, a tutorial booklet, and a full-color fold-out map. Since the program has very specific requirements for your hardware and system configuration, there is a comprehensive and well-designed utility program that analyzes potential problems and suggests solutions.

There are seven scenarios of increasing length and difficulty, covering the period from June 7 to July 2. Combat units are rated numerically for attack defense, morale, armor strength, antitank strength, disruption, and fatigue. The effectiveness of your units depends greatly on supply and terrain. Units in bunkers, for example, are almost immune to artillery, even the devastating gunfire of the British battleships. But units in open terrain can be annihilated by a few turns of bombardment.

Gold—Juno—Sword uses the same basic game "engine" as the previous titles in the series, but this release incorporates numerous bug fixes and patches likely to improve the playability of the earlier games.

For a generation of gamers that grew up rolling dice and pushing cardboard counters across paper maps that never seemed to lie flat, Three Sixty's V for Victory series is more than enough reason to buy the best computer you can afford. (Three Sixty Pacific, Inc., 2105 South Bascom Ave., Suite 165, Campbell, CA 95008. 408/879-9144)

MACINTOSH SOFTWARE REVIEW

CD-ROM TOOLKIT V1.0.3

Published By: FWB, Inc.
List Price: $79.95
Reviewed By: Matthew Leeds

The CD-ROM Toolkit (CDT) is an enhanced CD-ROM driver package. In addition to supporting a tremendous variety of CD-ROM drives, it adds two types of data caching, support for Photo CD, and an improved audio access program.

The CDT Control Panel automatically scans the SCSI bus for attached CD-ROM drives. You can disable the CDT for any given SCSI address, allowing the use of a different driver for that specific CD-ROM drive. You can also toggle the data caching for each specific SCSI address. In addition, you can set the amount of space used by the two types of data caches offered by CDT.

The CDT file cache is a file and directory information cache of data that has been read off the CD. It is cached to your hard drive, allowing subsequent reads to occur at hard drive speeds instead of CD speeds. There is an option to "pre-cache" certain information including directories, DeskTop files, System 7 icons, and System 7 aliases.

The CDT read ahead cache is designed to anticipate the next request for data off the CD. It reads the next several blocks of data each time your application requests data. This cache is stored in RAM.

CDT can provide Photo CD single session capabilities to most CD-ROM drives, and multisession capability to those drives with the requisite hardware support. It also provides extended audio capability via the CDT Remote DA. This includes audible scan in either direction, audio channel selection, and volume control.

CDT is a remarkable improvement over most of the commercial CD-ROM drivers bundled with drives and can extend the usable life of older drives by improving performance and adding Photo CD support. (FWB, Inc., 2040 Polk St., Suite 215, San Francisco, CA 94109. 415/474-8055) ■

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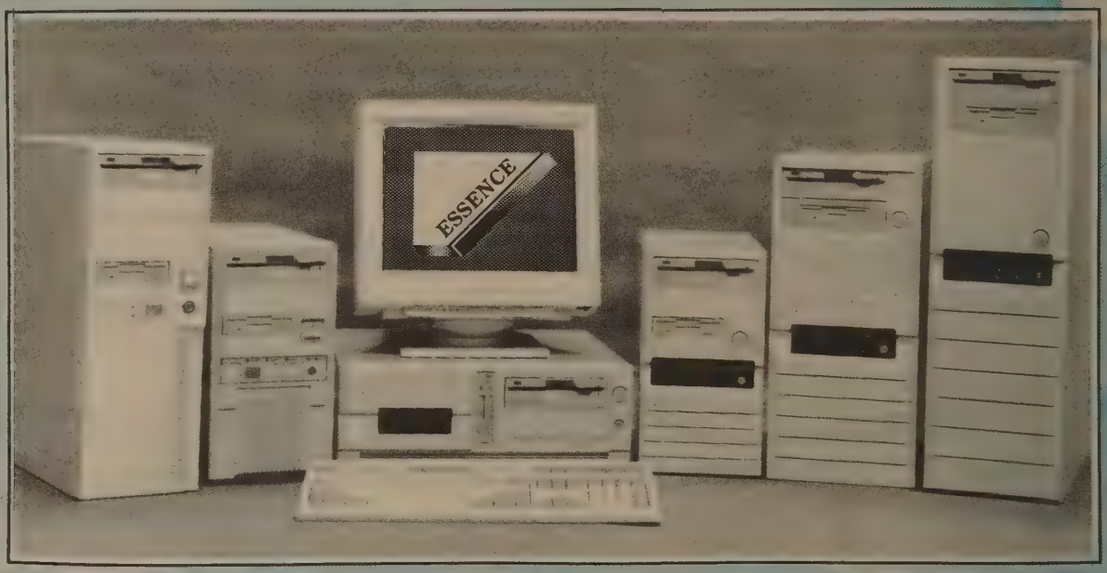

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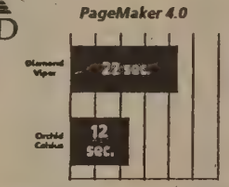

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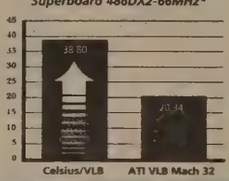

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Video Cards

Mono Graphics/Printer Card ..... $14.
AVGA1 VGA Card w/256k ..... $27.
AVGA3 5420 SVGA 1mb 32K Color .... $58.
AVGA3 5422 SVGA 1mb w/hi-color ... $68.
AVGA3 5426 VLB SVGA w/1mb ... $95.

ATI
ATI Graphics Ultra w/1mb VRAM, mouse .. $211.
ATI Graphics Ultra + w/2mb DRAM ..... $249.
ATI Graphics Ultra Pro w/2mb VRAM ..... $349.
ATI Graphics Ultra Pro EISA w/2mb VRAM . $455.
ATI Graphics Ultra Pro VLB w/2mb VRAM .. $380.

DIAMOND
Diamond SpeedStar Pro ISA w/1mb ..... $125.
Diamond SpeedStar Pro VLB w/1mb ..... $130.
Diamond Stealth 24 ISA w/1mb ..... $168.
Diamond Stealth 24 VLB w/1mb ..... $170.
Diamond Stealth Pro ISA w/1mb VRAM .. $260.
Diamond Stealth Pro VLB w/1mb VRAM . $265.
** 2mb Upgrade For Stealth Pro ISA or VLB ..... $100.
Diamond VIPER VLB w/2mb VRAM ..... $399.

ORCHID
Orchid Pro-Designer IIs w/1mb,Hi-Color ... $135.
Orchid Pro-Designer IIs-E EISA w/1mb .... $163.
Orchid Fahrenheit ISA 1mb Accelerator ... $170.
Orchid Fahrenheit VLB 1mb Accelerator ... $170.
Orchid Fahrenheit VA w/Voice Annotation $185.
Orchid Celsius VLB Accelerator w/1mb ... $240.
Orchid Celsius VLB Accelerator w/2mb ... $320.

Controller Cards

Parallel (Printer) Card ..... $10.
High Speed AT I/O (2 Ser,1 Par) .. $39.
AT IDE I/O (hdd/fdd,2ser,1par,1game) .... $16.
VLB IDE I/O (hdd/fdd,2ser,1par,1gme) ... $36.
Boca I/O (4 Serial & 2 Parallel Ports) ..... $95.
GSI-11V 2.88Mb (4 fdd w/cable) .. $55.
GSI-18V Co-Resident IDE Controller ..... $42.
GSI-21V 2.88Mb (4 fdd & 2 IDE hdd) ..... $62.
Tekram 600B (ISA IDE Caching) ..... $110.
Tekram 680 (VLB IDE Caching) ..... $168.
BusLogic KT445S (VLB SCSI Kit) ..... $275.
BusLogic KT542B (ISA SCSI Kit) ..... $225.

DTC Controllers

DTC-2290 EISA IDE hdd/fdd ..... $121.
DTC-3270VL VLB SCSI-2 ..... $130.
DTC-3290 EISA SCSI Caching, 0K ..... $435.
DTC-3292 EISA SCSI hdd/fdd .... $325.

Ultra-Stor Controllers

Mdl 14FA SCSI fdd/hdd ..... $210.
Mdl 14FK SCSI fdd/hdd Kit ..... $250.
Mdl 24F EISA SCSI fdd/hdd ..... $370.
Mdl 24F EISA SCSI fdd/hdd Kit .. $410.
Mdl 34F VLB SCSI fdd/hdd ..... $285.
Mdl 34F VLB SCSI fdd/hdd Kit ... $325.

Adaptec
AHA-1522K SCSI Adapter Kit ..... $153.
AHA-1542C SCSI BusMaster Card .... $205.
AHA-1542CK SCSI BusMaster Kit ..... $257.
AHA-1542CK+ SCSI BusMaster Kit .... $320.
AHA-2742AK EISA SCSI BusMster Kit .. $370.

Floppy Drives/Hard Drives & Tape Backups

Floppy Drives

TEAC 1.2mb 5.25" FDD ..... $54.
TEAC 1.44mb 3.5" FDD w/Kit ..... $45.
TEAC 2.88mb 3.5" FDD w/Kit ..... $87.
TEAC 2.88mb 3.5" FDD w/GSI 11V $140.
TEAC 2.88mb 3.5" FDD w/GSI 21V $147.
TEAC 2 in 1 Combo 1.2/1.44 .... $122.

Toshiba 1.2mb 5.25" FDD ..... $52.
Toshiba 1.44mb 3.5" FDD w/Kit ..... $43.
Toshiba 2.88mb 3.5" FDD w/Kit ..... $73.

Hard Drives

CONNER
CP-30174 170Mb IDE (17ms) ..... $198.
CP-30204 212Mb IDE (12ms) ..... $225.
CP-30200 212Mb SCSI-2 (14ms) $327.
CP-30254 250Mb IDE (14ms) ..... $238.
CP-30344 340Mb IDE (14ms) ..... $290.
CP-30544 540Mb IDE (12ms) ..... $550.
CP-30540 545Mb SCSI-2 Fast ... $555.

FUJITSU
M2624T 520Mb IDE (12ms) ..... $570.
M2624FA 520Mb SCSI (12ms) ... $575.
M2694SA 1.2Gb SCSI (12ms) .... $940.
M2652S 2.0Gb SCSI (12ms) .... $1590.
M2654S 2.4Gb SCSI (12ms) .... $1650.

Maxtor
MX-7131A 120Mb IDE (15ms) ..... $189.
MX-7120S 120Mb SCSI (15ms) .. $217.
MX-7170A 170Mb IDE (15ms) ..... $197.
MX-7213A 213Mb IDE (15ms) ..... $224.
MX-7213S 213Mb SCSI (15ms) .. $277.
MX-7245A 245Mb IDE (15ms) ..... $254.
MX-7245S 245Mb SCSI (15ms) .. $285.
MX-7345A 345Mb IDE (13ms) ..... $312.
MX-7345S 345Mb SCSI (13ms) .. $350.
MX-540SL 540Mb SCSI (8.5ms) .. $735.
MX-T-1240S 1.2Gb SCSI (8.5ms) $1220.

Hard Drives Cont.

Quantum™
ProDrive 127Mb IDE (17ms) ..... $186.
ProDrive 170Mb IDE (17ms) ..... $190.
ProDrive 240Mb IDE (15ms) ..... $245.
ProDrive 525Mb IDE (12ms) ..... $560.
ProDrive 127Mb SCSI (17ms) ..... $216.
ProDrive 170Mb SCSI (17ms) ..... $227.
ProDrive 240Mb SCSI (15ms) ..... $275.
ProDrive 525Mb SCSI-2 (12ms) ... $580.
ProDrive 700Mb SCSI-2 (12ms) ... $833.
ProDrive 1.05Gb SCSI-2 (12ms) .. $920.
ProDrive 1.2Gb SCSI-2 (12ms) ..... $985.

WESTERN DIGITAL
Caviar 210Mb IDE (13ms) ..... $225.
Caviar 250Mb IDE (13ms) ..... $240.
Caviar 340Mb IDE (13ms) ..... $290.
Caviar 420Mb IDE (13ms) ..... $395.

Tape Backups

COLORADO MEMORY SYSTEMS INC.
Trakker JT-10 External 120Mb ... $305.
Trakker JT-20 External 250Mb ... $359.
Jumbo DJ-10 Internal 120Mb ..... $124.
Jumbo DJ-20 Internal 250Mb ..... $179.
AB-11 External Adapter Kit ..... $32.
KE-09 External Drive Kit ..... $69.
FC-10 500Kb/s-1Mb/s Kit ..... $70.
TC-15 Data Compression Kit ..... $149.
Power Tape Internal 2.0Gb ..... $985.
Power Tape External 2.0Gb ..... $1125.
Power Tape Internal 4.0Gb ..... $1480.
Power Tape External 4.0Gb ..... $1620.

CONNER
Tape-Stor 250Mb Internal ..... $165.
w/ One Pre-Formatted Cartridge

Call for Other Hard Drive & Tape Backup Options

CD-Roms

SONY
CDU-31A Internal (490ms,w/Kit) ... $215.
CDU-31A External (490ms,w/Kit) .. $295.

Panasonic Office Automation
CR-522 Internal (390ms,w/Kit) ..... $215.
CR-562 Internal (320ms,300k) ..... $240.
CR-562 Internal w/ Interface ..... $265.

NEC
CDR-84 Internal SCSI (280ms) ..... $375.
CDR-74 External SCSI (280ms) .... $485.

TOSHIBA
3401 Internal (200ms,300k) ..... $395.
3401 Internal w/Kit (200ms,300k) $445.

Others
Mitsumi CRMC Int. (350ms) w/kit $175.
Texel DM5028 Int. (SCSI,235ms) .. $495.

Sound Cards & Speakers

CREATIVE
Sound Blaster Deluxe ..... $78.
Sound Blaster Pro Deluxe ..... $128.
Sound Blaster 16 (oem package) .. $158.
Sound Blaster 16 ..... $178.
Sound Blaster 16 ASP ..... $228.

MEDIA VISION
Pro Audio Spectrum 16 ..... $169.
Pro Audio Studio 16 ..... $229.

Labtec
CS-180 Micro Stereo Speakers $18.50
CS-550 Power Boosted Speakers $27.50
SS-700 3band EQ, Amplified $32.50
CS-800 5watt, Amplified, w/AC $39.50
SS-1000 Amplified, Panel Design $95.99

Zoltrix
ZX-55 Shielded Mini Speakers $9.95
ZX-28 3band EQ, Amplified $27.50

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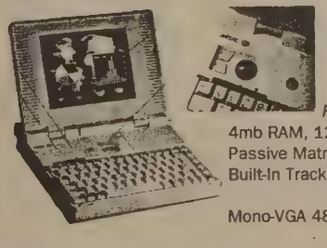

Features: Intel 486SX-33Mhz CPU 4mb RAM, 120mb HDD,5.9lbs,Digital Controls, Passive Matrix Color,Windows Accelerator Built-In Trackball,Optional Mini-Docking Station

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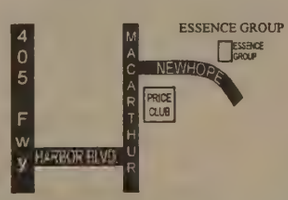

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MULTIMEDIA SYSTEMS

Harmony II Multimedia Kit $365.00
- Panasonic CR-522B Internal CD-ROM Drive - 390ms
- Sound Blaster Pro Stereo Sound Card
- 5 CD titles - MPC Encyclopedia, US Atlas, World Atlas, King's Quest V, & Mixed UP Mother Goose

Harmony IIIA Multimedia Kit $485.00
- Panasonic CR-562B Internal Double-spin, Multi-session CD-ROM - 320ms, 300kb/s Data transfer rate
- Sound Blaster 16 Stereo Sound Card - 16bit Sound Quality
- 7 CD titles - MPC Encyclopedia, US Atlas, World Atlas, King's Quest V, Mixed Up Mother Goose, Tempra Photo CD, & Sherlock Holmes Consulting Detective
- A Microphone & a pair of Mini Speakers

Sun Moon Star Multimedia Upgrade Kit $365.00
- SONY CDU-31A Internal CD-ROM Drive - 490ms
- Sun Moon Star stereo sound board with sound utilities and bulti-in CDU-31A interface, Sound blaster Pro Basic compatible
- 5 leading multimedia CD titles - Multimedia Encyclopedia '92, World Atlas, U.S. Atlas, Chessmaster 3000 and Beacon's Typing Program
- A pair of Mini Speakers

Mitac Multimedia Upgrade Kit $375.00
- Mitsumi Internal CRMC CD-ROM (350ms, Kodak Photo CD compatible)
- Sound Galaxy NX Pro Sound Card
- Shielded Stereo Computer Speakers
- Software bundled: Compton's Multimedia Encyclopedia for Windows, The KGB/CIA World Factbook, Dictionary of the Living World, Grammy Awards, CD-ROM Software Jukebox

Creative Labs Discovery CD 16 Upgrade Kit (Internal) $470.00
- **Sound Blaster** 16 Stereo Sound Card
- Creative Labs Internal CD-ROM (Panasonics CD-ROM), 64KB Buffer, 150KB/sec Data Transfer, 390ms Access rate, Photo CD compatible
- A pairs of Stereo Speakers
- Software bundled: Multimedia Encyclopedia, The Animals!, Lemmings

Creative Labs Edutainment CD 16 Upgrade Kit (Internal) $530.00
- **Sound Blaster** 16 Stereo Sound Card
- Creative Labs Internal CD-ROM (Panasonics CD-ROM), 64KB Buffer, 150KB/sec Data Transfer, 390ms Access rate, Photo CD compatible
- A pairs of Stereo Speakers
- Software bundled: The San Diego Zoo Presents ... The Animals!, Where in the World is Carmen Diego?, Multimedia Enclopedia, Just Grandma and Me, The Secret of Monkey Island, Loom, Secret Weapons of the Luftwaffe, Sherlock Holmes - Consulting Detective

Media Vision Fusion DoubleCD 16 (Internal) $615.00
- NEC CDR-55J Internal CD-ROM Drive - 350ms
- Media Vision Pro Audio 16 Stereo Sound Card
- High-quality Labtec Amplified Speaker System
- Software bundled: 7th Guest, Battle Chess, Compton Interactive Encyclopedia, Arthur's Teacher Trouble

Media Vision Pro-16 Multimedia System II $895.00
- NEC CDR-84 Internal SCSI CD-ROM (Multi-Session, 280ms)
- Media Vision **Pro Audio Studio** 16 Stereo Sound Card
- Software bundled: Carmen San Diego, Compton's Encyclopedia, Lotus 1-2-3, King's Quest V, Nautilus CD, and MacroMind Action! CD

Media Resource Pro-16 Multimedia System $570.00
- Toshiba 3401B Internal SCSI CD-ROM (Multi-Session, 200ms)
- Media Vision Pro Audio Spectrum 16 Stereo Sound Card
- A pair of Speakers

Media Resource Digital Multimedia System $640.00
- Toshiba 3401B Internal SCSI CD-ROM (Multi-Session, 200ms)
- Media Master Digital 16 Stereo Sound Card (Ad-Lib Module) Sound Blaster Module +$60.00
- A pair of Stereo Digital Sound Speakers

CD-ROMS

Mitsumi CRMC Internal CD-ROM w/Interface (350ms) $175.00
NEC CDR-74-1 External SCSI CD-ROM (280ms) $485.00
NEC CDR-84-1 Internal SCSI CD-ROM (280ms) $425.00
NEC CDR-84-1 Internal SCSI CD-ROM (280ms OEM) $375.00
Panasonic CR-522-B Internal CD-ROM w/Interface $215.00
Panasonic CR-562-B Internal CD-ROM (Double spin) $240.00
Panasonic CR-562-B Internal CD-ROM (Double spin) w/Interface $265.00
SONY CDU-31A Internal CD-ROM w/Interface $215.00
SONY CDU-31A External CD-ROM w/Interface $295.00
TEXEL DM3028 Internal SCSI CD-ROM (235ms Access) $395.00
TEXEL DM5028 External SCSI CD-ROM (235ms Access) $490.00
Toshiba 3401B Internal SCSI CD-ROM $395.00
Toshiba 3401B Internal SCSI CD-ROM w/Interface $445.00
External SCSI Case for SCSI CD-ROM w/Cable $95.00

SOUND CARDS

Creative Lab Sound Blaster Deluxe $78.00
Creative Lab Sound Blaster Pro Deluxe $128.00
Creative Lab Sound Blaster 16 Basic $155.00
Creative Lab Sound Blaster 16 OEM $158.00
Creative Lab Sound Blaster 16 ..... $178.00
Creative Lab Sound Blaster 16 ASP $228.00
Creative Lab Video Blaster w/Microsoft video for Win $355.00
Media Vision Pro Audio Spectrum 16 Basic Sound Card $149.00
Media Vision Pro Audio Spectrum 16 Sound Card $169.00
Media Vision Pro Audio Studio 16 Sound Card $229.00
Media Vision Pro Movie Spectrum Video Capture card $325.00
Orchid Sound Producer Pro w/Mic & Speaker $88.00

SPEAKERS & ACCESSORIES

Creative Labs CT-38 Shilded Amplified Stereo Speakers $26.50
Labtec AM-22 Deluxe Microphone $13.95
Labtec C-10 Computer Stereo Headphone $14.95
Labtec CS-150 Shielded Amplified Stereo Speakers $19.50
Labtec CS-180 Shielded Amplified Stereo Speakers $18.50
Labtec CS-550 Shielded Amplified Stereo Speakers $27.50
Labtec SS-700 Shielded Amplified Stereo Speakers w/3 Band EQ $32.50
Labtec CS-800 Shielded Amplified Stereo Speakers w/AC Adapter $38.50
Labtec CS-1000 Shielded Amplified Stereo Speakers $88.00
Labtec AD-4400mA AC Adapter (for Speakers System) $9.95
Zoltrix ZX-55 Mini Speakers $9.95
Zoltrix ZX-28 Shielded Amplified Stereo Speakers w/3 Band EQ $27.95

CD TITLES

CD Pak for DOS $82.00
- 6 Titles: Multimedia Encyclopedia, The Animals!, Reference Library, US Atlas, World Altas, & The Secret of Monkey Island

CD Pak for Windows $82.00
- 6 Titles: Multimedia Encyclopedia, The Animals!, Chessmaster 3000, US Atlas, World Atlas, & Beacon Teaches Typing 2.0

CD Pak for Home $64.00
- 5 Titles: Tempra Access Photo CD, The Animals!, US Atals, World Atlas, & Mayo Clinic

CD Pak for Entertainment $64.00
- 5 Titles: Mario is Missing, D/Generation, Chessmaster 3000, Wind Commander / Ultima VI, & The Secret of Monkey Island

CD Quartet 1 ..... $38.00
- US Atlas, World Atlas, Chessmaster 3000, Mavis Beacon Teaches Typing

CD Quartet 2 ..... $43.00
- US Atlas, World Atlas, Reference Labrary, Secret of Monkey Island

BUSSINESS

American Bus Phone Book - 1992 (DOS) $27.00
Authorware Star (MPC) $52.00
Business & Economy Atlas (DOS) $29.00
Kodak Photo CD (MPC) $25.00
Lotus 1-2-3 V3.1 (MPC) $89.00
Macromind Action (MPC) $36.00
Marketing Master 1992 (DOS) $28.00
Microsoft Works (MPC) $50.00
Publish It 2.0 (DOS) $27.00
TEMPRA Access Photo CD Imaging Software (DOS) $24.00

EDUCATION

Animals! (MPC) $24.00
Annabel's Dreams (MPC) $85.00
Arthur's Teacher Trouble (MPC) $32.00
Audubon's Mammals (DOS) $31.00
Audubon's Birds (DOS) $31.00
Barron's College Guide (MPC) $29.00
Bring the World to Your Senses (DOS) $19.00
Carmen San Diego (DOS) $30.00
Choose your College $21.00
Collection of PC Graphics (DOS) $22.00
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Family Choice / Britannica (DOS) $27.00
Family Doctor (DOS/MAC) $27.00
Family Education Collections (DOS) $28.00
Great Cities - Vol. 1 (DOS) $28.00
Great Cities - Vol. 2 (DOS) $28.00
Jets & Props - Aris (MPC) $28.00
Language of the World for Windows (MPC) $40.00
Library of Future 1st (DOS) $51.00
MacMillan Dictionary for Children (MPC) $34.00
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Media Clips - Jets, Props, View, Place (MPC) $46.00
Microsoft BookShelf (MPC) $50.00
National Geographic Mammals (DOS) $31.00
National Parks (DOS) $23.00
Ocean Digital Imagery V1 (DOS) $40.00
Playing Language - English (DOS) $30.00
Playing Language - French (DOS) $30.00
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Renaissance Master I (MPC) $34.00
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Illustrated Works of Shakespeare $23.00
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Sound Library (MPC) $21.00
Survey of Western Arts (MPC) $34.00
TIME Almanac - 1991 (DOS) $32.00
Time Table of History (DOS) $21.00
Toolworks Multimedia Encyclopedia (MPC) $57.00
Toolworks Reference Library (DOS) $25.00
U.S. Atlas & Automap (DOS) $28.00
Atlas Pak - US / World Atlas (DOS) $23.00
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CIA World Fact Book (DOS) $27.00
Guinness Disc of Records 1993 (MPC) $30.00
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Mario Mission / World Atlas (DOS) $30.00
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Mixed up Mother Goose (MPC) $25.00
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PC-SIG 11th Edition (DOS) $23.00
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Who Killed Sam Rupert (DOS/MPC) $34.00
Willie Beamish - The Adventure (DOS) $25.00
Wing Commader / Ultima VI (DOS) $25.00
Wizard $21.00

SYSTEM BOARDS

SYSTEM BOARDS (w/CPU, 0K Memory) - AMI

AMI Enterprise III 486DX2-66MHz **EISA VLB** M/Bw/256K Cache $1295.00
AMI Enterprise III 486DX-50MHz **EISA VLB** M/Bw/256K Cache $1160.00
AMI Enterprise III 486DX-33MHz **EISA VLB** M/Bw/256K Cache $945.00

AMI Baby EISA 486DX2-66MHz **EISA VLB** M/Bw/256K Cache $1205.00
AMI Baby EISA 486DX-50MHz **EISA VLB** M/Bw/256K Cache $1065.00
AMI Baby EISA 486DX-33MHz **EISA VLB** M/Bw/256K Cache $855.00

AMI Super Voyager 486DX2-66MHz **VLB** M/Bw/256K Cache $1170.00
AMI Super Voyager 486DX-50MHz **VLB** M/Bw/256K Cache $1065.00
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AMI Super Voyager 486DX-33MHz **VLB** M/Bw/64K Cache $805.00
AMI Super Voyager 486SX-33MHz **VLB** M/Bw/256K Cache $662.00
AMI Super Voyager 486SX-33MHz **VLB** M/Bw/64K Cache $632.00
AMI Super Voyager 486SX-25MHz **VLB** M/Bw/64K Cache $515.00

SYSTEM BOARDS (w/CPU, 0K Memory) - IBM (Alaris)

IBM Leopard 486SLC2-50 **VLB** M/Bw/64K Cache $290.00
IBM Leopard 486SLC2-66 **VLB** M/Bw/64K Cache $360.00
**Leopard 486SLC2 M/B has 2 VLB slots, & 16K Internal Cache*
**Manufacturd in the U.S.A. by IBM Charlott, NC, w/ 3yr limited warranty*
**128K Cache Upgrade from 64K +$15, Math Co-Processor Upgrade +$45.*

SYSTEM BOARDS (w/CPU, 0K Memory) - MICRONICS

Micronics EV 486DX2-66MHz **EISA VLB** M/Bw/256K Cache $1260.00
Micronics EV 486DX2-50MHz **EISA VLB** M/Bw/256K Cache $1075.00
Micronics EV 486DX-33MHz **EISA VLB** M/Bw/256K Cache $890.00

Micronics E3 486DX2-66MHz **EISA** M/Bw/256K Cache $1205.00
Micronics E3 486DX-50MHz **EISA** M/Bw/256K Cache $1060.00
Micronics E3 486DX-33MHz **EISA** M/Bw/256K Cache $825.00

Micronics Gemini 486DX2-66MHz **VLB** M/Bw/256K Cache $1160.00
Micronics Gemini 486DX-50MHz **VLB** M/Bw/256K Cache $945.00
Micronics Gemini 486DX-33MHz **VLB** M/Bw/256K Cache $800.00
Micronics Gemini 486SX-25MHz **VLB** M/Bw/0K Cache $420.00

Micronics MX-30486DX2-66MHz **VLB** M/Bw/256K Cache $1080.00
Micronics MX-30486DX-50MHz **VLB** M/Bw/256K Cache $830.00
Micronics MX-30486DX-33MHz **VLB** M/Bw/256K Cache $680.00
Micronics MX-30486SX-25MHz **VLB** M/Bw/0K Cache $303.00

Micronics Mini 486DX2-66MHz M/Bw/256K Cache w/IO $1040.00
Micronics Mini 486DX-50MHz M/Bw/256K Cache w/IO $910.00
Micronics Mini 486DX-50MHz M/Bw/256K Cache w/IO $820.00
Micronics Mini 486DX-33MHz M/Bw/256K Cache w/IO $635.00
Micronics Mini 486SX-25MHz M/Bw/0K Cache w/IO $279.00

SYSTEM BOARDS (w/o CPU, 0K Memory) - EISA

AIR Baby 486 **EISA VLB** M/Bw/256K Cache (72pin Memory) $415.00
AIR Baby 486 **EISA VLB** M/Bw/256K Cache (30pin Memory) $425.00
** AIR EISA VESA Local Bus M/B has 3 VLB slots & Bus Master function, ZIF socket, USA made*

VESA Baby 486 **EISA** M/Bw/256K Cache (USA made) $365.00

SYSTEM BOARDS (w/o CPU, 0K Memory) - VESA Local Bus

AIR Baby 486 **VLB** M/Bw/256K Cache $210.00
** AIR (UMC) VESA Local Bus M/B has 3 VLB slots & Bus Master function, ZIF socket*

HiNT Baby 486 **EISA VLB** M/Bw/256K Cache $227.00
** HiNT EISA VESA Local Bus M/B has 3 EISA & 2 VLB slots, ZIF socket.*

OPTi Mini 486 **VLB** M/Bw/128K Cache (Slave mode) $120.00
OPTi Mini 486 **VLB** M/Bw/128K Cache (Bus Master mode) $124.00
OPTi Mini 486 **VLB** M/Bw/256K Cache (Bus Master mode) $136.00
OPTi Mini 486 **VLB** M/Bw/256K Cache (Bus Master mode) w/ZIF socket $146.00
** OPTi VESA Local Bus M/B has 2 VLB slots*

Orchid 486 **VLB** M/Bw/256K Cache (USA made) $175.00

UMC Mini 486 **VLB** M/Bw/256K Cache $154.00
** UMC VESA Local Bus M/B has 2 VLB slots & Bus Master function, ZIF socket*

VEGA Mini 486 **VLB** M/Bw/256K Cache (USA made) $190.00
** VEGA VESA Local Bus M/B has 3 VLB slots & Bus Master function, ZIF socket*

SYSTEM BOARDS (w/o CPU, 0K Memory) - ISA

VEGA ISA 486, 64MB 6layers M/B:
VEGA Baby 486 M/Bw/64K Cache (USA made) $210.00
VEGA Baby 486 M/Bw/256K Cache (USA made) $185.00
VEGA ISA 3486, 32MB M/B:
VEGA Baby 3486 M/Bw/64K Cache (USA made) $185.00
VEGA Baby 3486 M/Bw/256K Cache (USA made) $160.00

SIS Mini 486 M/Bw/256K Cache $125.00

Cyrix 486DLC M/B (w/Cyrix 486DLC CPU):
OPTi Mini 486DLC M/Bw/128K Cache (w/o CPU & Math Co) $95.00
OPTi Mini 486DLC-40MHz M/Bw/128K Cache (w/CPU & Math Co) $237.00
OPTi Mini 486DLC-33MHz M/Bw/128K Cache (w/CPU & Math Co) $235.00

OPTi Mini 386DX M/Bw/128K Cache (w/o CPU) $95.00
OPTi Mini 386DX-40MHz M/Bw/128K Cache (w/CPU) $155.00
OPTi Mini 386DX-33MHz M/Bw/128K Cache (w/CPU) $176.00

PC Mini 386SX-40MHz M/B $92.00
PC Mini 386SX-33MHz M/B $87.00
OPTi Mini 386SX-33MHz M/B $125.00

MICROPROCESSORS (CPU)

Intel 486DX2-66MHz CPU $490.00
Intel 486DX-50MHz CPU $440.00
Intel 486DX2-50MHz CPU $340.00
AMD 486DX-40MHz CPU $290.00
Intel 486DX-33MHz CPU $300.00
Intel 486SX-33MHz CPU (PGA) $165.00
Intel 486SX-33MHz CPU (PQFP) $145.00
Intel 486SX-25MHz CPU (PGA) $109.00
Intel 486SX-25MHz CPU (PQFP) $108.00
Cyrix 486DLC-40CPU with Math Coprocessor $126.00
Cyrix 486DLC-33CPU with Math Coprocessor $124.00
AMD 386DX-40MHz CPU (PGA) $71.00
AMD 386DX-40MHz CPU (PQFP) $60.00
Intel 386DX-33MHz CPU $81.00

ESSENCE GROUP

17815 Newhope Street, Suite G, Fountain Valley, CA 92708
Order Hot Line: 1-714-546-3110 ✧ Technical Support: 1-714-546-7902 ✧ Fax Order Line: 1-714-546-3803

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ADD-ON BOARDS

Mono/Graphics/Printer Card	$14.00
AVGA-1 VGA Card w/256K	$27.00
AVGA-3 (Cirrus Logic GD5420) 1MB Graphics Accelerator (32K color)	$58.00
AVGA-3 (Cirrus Logic GD5422) 1MB Graphics Accelerator (32K color)	$68.00
TVGA-9000 VGA Card w/256K (Trident 9000 Chipset, upto 512K)	$32.00
TVGA-8900CL 1MB Super VGA Card (2x faster than Trident 8900C)	$58.00
PVGA-1DW Graphics Accelerator w/1MB & Hi-Color Chip	$90.00
Cirrus Logic GD5426 VLB Graphics Accelerator w/1MB	$95.00
ATi Graphics Ultra w/1MB VRAM & Mouse	$211.00
ATi Graphics Ultra Plus (1280x1024, 2MB Dram)	$249.00
ATi Graphics Ultra Pro (1280x1024 Non-Interlaced, 2MB VRam)	$349.00
ATi Graphics Ultra Pro EISA w/2MB VRAM	$455.00
ATi VLB mach32 Graphics Ultra Pro w/2MB VRAM	$380.00
Diamond SpeedStar Pro Graphics Accelerator w/1MB	$125.00
Diamond SpeedStar Pro VLB Graphics Accelerator w/1MB	$130.00
Diamond Stealth-24 1MB Windows Accelerator (16Million colors)	$168.00
Diamond Stealth-24 VLB Windows Accelerator w/1MB	$170.00
Diamond Stealth Pro Graphics Accelerator w/1MB VRAM	$260.00
Diamond Stealth Pro VLB Graphics Accelerator w/1MB VRAM	$265.00
Diamond Viper VLB Graphics Accelerator w/2MB	$399.00
Orchid Pro-Designer IIs 1MB VGA Card w/Sierra RAMDAC	$135.00
Orchid Pro-Designer IIs-E 1MB EISA VGA Card w/Sierra RAMDAC	$163.00
Orchid Fahrenheit Windows Accelerator w/1MB	$170.00
Orchid Fahrenheit-VA Accelerator w/Voice Annotation/1Mb	$185.00
Orchid Fahrenheit VLB Windows Accelerator w/1MB	$170.00
Orchid Celsius VLB Graphics Accelerator w/1MB	$240.00
Orchid Celsius VLB Graphics Accelerator w/2MB	$320.00
High Speed ATI/O (2 Serial 1 Parallel) - compatiable 16C550	$39.00
Parallel (Printer) Card	$10.00
AT Super IDE IO Adapter (Dual floppy & hard disk, 2S, 1P, 1G)	$16.00
VESA Local Bus Super IDE & IO (2S, 1P, 1G)	$36.00
BOCA I/O - 4 Serial & 2 Parallel ports	$95.00
GSI-11 V 2.88M Four (4) Floppy Controller & Cable	$55.00
GSI-18 V Co-resident IDE Controller (Works with ST412, ESDI, SCSI)	$42.00
GSI-21 V 2.88M Four (4) Floppy & Intelligent IDE Adapter w/Cable	$62.00
Promise DC-2001 ISA IDE Caching Controller (0K, upto 16MB)	$100.00
Promise DC-2040 ISA SCSI Caching Controller (0K, upto 16MB)	$265.00
Promise DC-4030 VL VLB IDE Caching Controller (0K, upto 16MB)	$145.00
Promise DC-420 VLB IDE Caching Controller (512K, upto 1MB)	$150.00
Tekram DC-600B ISA IDE Caching Controller (upto 16MB)	$110.00
Tekram DC-680 VLB IDE Caching Controller (upto 16MB)	$168.00
Bus Logic KT445S VLB SCSI Controller Kit	$275.00
Bus Logic KT542B ISA SCSI Controller Kit	$225.00
Bus Logic KT545S ISA FAST SCSI-2 Controller Kit	$235.00
Bus Logic KT747S EISA FAST SCSI-2 Controller Kit	$355.00
DTC-2290 EISA IDE Floppy/Hard Disk Contorller	$121.00
DTC-3270 VL VLB SCSI-2 Controller	$130.00
DTC-3290 EISA SCSI Caching FD/HD Controller (0K, upto 4MB)	$435.00
DTC-3292 EISA SCSI FD/HD Controller	$325.00
UltraStor 14F A SCSI FD/HD Controller	$210.00
UltraStor 14F A SCSI FD/HD Controller Kit	$250.00
UltraStor 24F EISA SCSI FD/HD Controller	$370.00
UltraStor 24F EISA SCSI FD/HD Controller Kit	$410.00
UltraStor 34F VESA Local Bus SCSI FD/HD Controller	$285.00
UltraStor 34F VESA Local Bus SCSI FD/HD Controller Kit	$325.00
Future Domain 1680 SVP 16-bit SCSI Floppy/Hard Disk Adapter Kit	$145.00
Always IN-2000 16-bit SCSI Host Adapter (Novell Certified)	$189.00
Always AL-1000 Parallel to SCSI Adapter	$168.00
ADAPTEC AHA-1522K SCSI Adapter Kit	$153.00
ADAPTEC AHA-1542C SCSI Bus Master Host Adapter (Card only)	$205.00
ADAPTEC AHA-1542CK SCSI Bus Master Host Adapter Kit	$257.00
ADAPTEC AHA-1542CK-Plus SCSI Bus Master Host Adapter Kit	$320.00
ADAPTEC AHA-2742AK EISA SCSI Bus Master Adapter Kit	$370.00
ADAPTEC AHA-2842AK VLB SCSI Bus Master Adapter Kit	$305.00

MONITORS

AMDEK 432N 114" Mono VGA Monitor (Amber or Paper-white)	$125.00
CTX 5439A 14" Super VGA Color Monitor (1024x768, 39dp)	$222.00
CTX 5468A 14" Super VGA (TriScan) Color Monitor (1024x768, 28dp)	$254.00
CTX 1451 14" Full-Screen NI Color Monitor (1024x768, 28dp)	$274.00
CTX 1461 14" NI Color Monitor (1024x768, 72Hz refresh)	$300.00
CTX 1461LR 14" NI Color Monitor (1024x768, 72Hz refresh)	$315.00
CTX 1560LR 15" Digital NI Color Monitor (1024x768, 28dp)	$392.00
CTX 1760LR 17" Digital NI Color Monitor (1280x1024, 28dp)	$745.00
DigiView HR-1401 14" Super VGA Color Monitor (1024x768, 39dp)	$212.00
DigiView HR-1428 14" Super VGA Color Monitor (1024x768, 28dp)	$245.00
DigiView HR-1430ni 14" Non-Interlaced Monitor (1024x768, 28dp)	$263.00
MAG 1564 15" Color Monitor (1280x1024, .28dp)	$435.00
MAG MX-15H 15" Color Monitor (1280x1024, .28dp)	$480.00
MAG MX-17H 17" Color Monitor (1280x1024, .28dp)	$898.00
Mitac 1464P 14" 1280x1024 NI Monitor (1280x1024, .28dp)	$310.00
Mitac 1564PD 15" Digital On-Screen NI Monitor (1280x1024, .28dp)	$395.00
NEC 3FGe 15" Multi-Frequency Color Monitor (1024x768, 28dp)	$625.00
NEC 4FGe 15" Multi-Frequency Color Monitor (1024x768, .28dp)	$740.00
NEC 5FGe 17" Multi-Frequency Color Monitor (1024x768, .28dp)	$1125.00
NEC MultiSync 5FG 21" Color Monitor (1280x1024, .28dp)	$1330.00
NEC MultiSync 6FG 21" Color Monitor (1280x1024, .28dp)	$2380.00
Optiquest 800S 14" VGA Color Monitor (640x480, .39dp)	$209.00
Optiquest 900S 14" Super VGA Color Monitor (1024x768, .28dp)	$252.00
Optiquest 1000S 14" Non-Interlaced Color Monitor (1024x768, .28dp)	$275.00
Optiquest 1500D 14" Digital Non-Interlaced Monitor (1024x768, .28dp)	$357.00
Optiquest 2000DX 15" Digital Multi-Freq Monitor (1280x1024, .28dp)	$375.00
Optiquest 4000D 17" Digital Multi-Freq Color Mtr. (1280x1024, .28dp)	$740.00
Sony CPD-1320 14" Non-Interlaced Monitor (640x480, .25dp)	$357.00
Sony CPD-1430 14" Multi Scan Monitor (Non-Interlaced, .25dp)	$597.00
Sony CPD-1730 17" Multi Scan Monitor (Non-Interlaced, .25dp)	$1043.00
Sony CPD-2036S 20" Multi Scan Monitor (non-Interlaced, .30dp)	$1995.00
ViewSonic 4E 14" Super VGA Color Monitor (1024x768, .28dp)	$273.00
ViewSonic 6E 14" Non-Interlaced Color Monitor (1024x768, .28dp)	$296.00
ViewSonic 5E 14" NI Color Monitor (1024x768, 72Hz refresh)	$379.00
ViewSonic 7 17" Digital Multi-Frequency Color Monitor (.28dp)	$808.00
ViewSonic 1515" Digital Multi-Freq Color Monitor (.28dp, 76Hz refresh)	$459.00
ViewSonic 1717" Digital Multi-Freq Color Monitor (.28dp, 1600x1280)	$975.00
ViewSonic 2020 20" Digital Multi-Freq Color Monitor (.28dp, 1600x1280)	$1655.00
ViewSonic 2121 "Digital Multi-Freq Color Monitor (.28dp, 1600x1280)	$1885.00
**** Please call for Hitachi, Mitsubishi, Radius, and many others.*	

FLOPPY & HARD DRIVES

TEAC 1.2MB FDD (5.25")	$54.00
TEAC 1.44MB FDD (3.5") w/Mounting Kit	$45.00
TEAC 2-in-1 1.2/1.44MB FDD	$122.00
TEAC 2.88MB FDD (3.5") w/Mounting Kit	$87.00
Toshiba 1.2MB FDD (5.25")	$52.00
Toshiba 1.44MB FDD (3.5") w/Mounting Kit	$43.00
Toshiba 2.88MB FDD (3.5") w/Mounting Kit	$73.00
Iomega Floptical Drive w/SCSI Interface (21MB)	$429.00
Iomega Floptical Disk (21MB)	$27.00
Sysgen ValueStor Floptical Drive w/Kit	$332.00
Sysgen ValueStor Floptical Disk - Dual pak	$52.00
Conner CP-30174170MB IDE HDD (17ms)	$198.00
Conner CP-30170E 170MB SCSI HDD (17ms)	$215.00
Conner CP-30204212MB IDE HDD (12ms, 256K cache buffer)	$225.00
Conner CP-30200212MB SCSI-2 HDD	$327.00
Conner CP-30254250MB IDE HDD (14ms, 64K cache buffer)	$238.00
Conner CP-30344340MB IDE HDD (14ms)	$290.00
Conner CP-30544520MB IDE HDD (12ms, 256K cache buffer)	$550.00
Conner CP-30540545MB Fast SCSI-2 HDD (12ms, 256K cache buffer)	$555.00
Conner CP-1060S 1.06Gb Fast SCSI-2 HDD (9ms, 512k cache buffer)	$990.00
Conner CP-313701 1.37Gb Fast SCSI-2 HDD (10ms, 256k Cache)	$1070.00
Fujitsu M2624T 520MB IDE HDD (12ms, 5yr warranty)	$570.00
Fujitsu M2624FA 520MB SCSI HDD (12ms, 5yr warranty)	$575.00
Fujitsu M2694SA 1.2GB SCSI HDD (10.5ms, 3.5", 5yr warranty)	$940.00
Fujitsu M2652S 2.0GB SCSI HDD (12ms, 5yr warranty)	$1590.00
Fujitsu M2654S 2.4GB SCSI HDD (12ms, 5yr warranty)	$1650.00
Maxtor MX-7131A 131MB IDE HDD (15ms)	$189.00
Maxtor MX-7120S 120MB SCSI HDD (15ms)	$217.00
Maxtor MX-7213A 213MB IDE HDD (15ms)	$224.00
Maxtor MX-7213S 213MB SCSI HDD (15ms)	$277.00
Maxtor MX-7245A 245MB IDE HDD (14ms)	$254.00
Maxtor MX-7245S 245MB SCSI HDD (14ms)	$285.00
Maxtor MX-7345A 345MB IDE HDD (14ms)	$312.00
Maxtor MX-7345S 345MB SCSI HDD (14ms)	$350.00
Maxtor MX-540SL 540MB SCSI HDD (8.5ms)	$735.00
Maxtor MXT-1240S 1.2GB SCSI HDD (8.5ms)	$1220.00
Quantum ProDrive ELS 127MB IDE HDD (17ms, 2yr warranty)	$186.00
Quantum ProDrive ELS 170MB IDE HDD (17ms, 2yr warranty)	$190.00
Quantum ProDrive LPS 240MB IDE HDD (15ms, 256K Cache)	$245.00
Quantum ProDrive 525 AT 525MB IDE HDD (12ms, 512K Cache)	$560.00
Quantum ProDrive ELS 127MB SCSI HDD	$216.00
Quantum ProDrive ELS 170MB SCSI HDD	$227.00
Quantum ProDrive LP 240MB SCSI HDD	$275.00
Quantum ProDrive 525S 525MB SCSI HDD	$580.00
Quantum ProDrive 700S 700MB SCSI HDD (5yr warranty)	$833.00
Quantum ProDrive 1050S 1050MB SCSI-2 HDD (5yr warranty)	$920.00
Quantum ProDrive 1225S 1225MB SCSI-2 HDD (5yr warranty)	$985.00
Toshiba MK-438FB 877MB SCSI-2 HDD (12.5ms)	$820.00
Toshiba MK-538FB 1.2GB SCSI-2 HDD (12.5ms)	$920.00
Western Digital AC2200209MB IDE HDD (13ms)	$225.00
Western Digital AC2250250MB IDE HDD (13ms)	$240.00
Western Digital AC2340340MB IDE HDD (13ms)	$290.00
Western Digital AC2420420MB IDE HDD (13ms0	$395.00
**** Please call for Micropolis, Seagate, & Toshiba Hard Disk Drives prices*	
SyQuest SQ5544MB SCSI Removable Disk Drive	$265.00
SyQuest SQ5110C 88MB SCSI Removable Disk Drive	$320.00
SyQuest SQ3105 105MB IDE Removable Disk Drive (3.5")	$415.00
SyQuest SQ3105 105MB SCSI Removable Disk Drive (3.5")	$425.00
SyQuest SQ3105 105MB IDE Internal Removable Disk Kit w/Adapter	$495.00
SyQuest SQ3105 105MB External Parallel Removable Disk Drive	$595.00
SyQuest SQ400 44MB Cartridge	$75.00
SyQuest SQ800 88MB Cartridge	$108.00
SyQuest SQ3105 105MB 3.5" Cartridge	$90.00
SyQuest SQ01 SCSI Adapter w/Software	$45.00
SCSI External Case for SyQuest 5.25" Disk Drive	$95.00
Conner Tape Stor 250MB Tape Backup w/One Pre-formatted Cartridge	$165.00
Hi-Hite (Archive) California 525 525MB SCSI Tape Backup	$525.00
Colorado Memory System JT-10120MB Parallel Port Tape Backup	$305.00
Colorado Memory System JT-20250MB Parallel Port Tape Backup	$349.00
Colorado Memory System DJ-10120MB Tape Backup	$124.00
Colorado Memory System DJ-20250MB Tape Backup	$179.00
Colorado Memory System AB-11 External Adapter Kit	$32.00
Colorado Memory System KE-09 External Drive Kit	$69.00
Colorado Memory System FC-10 500Kb/s-1Mb/s Adapter Kit	$70.00
Colorado Memory System TC-15 Data Compression Adapter Kit	$149.00
Colorado Memory System Ext. Power Tape 2.0GB Tape Backup	$985.00
Colorado Memory System Int. Power Tape 4.0GB Tape Backup	$1480.00
3M DC2120250MB Pre-formatted Mini Data Cartridge (Ximat format)	$19.50
3M DC2120120/250MB Mini Data Cartridge	$17.50
Sony QD2120120/250MB Mini Data Cartridge	$15.50
Maxell DC-2120120/250MB Mini Data Cartridge	$15.00

CHASSIS (CASES)

CS-B01 Baby AT Case w/200W P.S. (3x5.25", 1x3.5")	$51.00
CS-20 Baby AT Case w/200W U.L.P.S. (3x5.25", 1x3.5")	$83.00
CS-35 Mid Vertical Case w/230W U.L.P.S. (3x5.25", 3x3.5", Digital)	$90.00
CS-36 Full Vertical Case w/230W U.L.P.S. (6x5.25", 2HD, Digital)	$122.00
CS-300GTS Full Vertical Case w/300W U.L.P.S. (7x5.25", Double fan)	$175.00
CS-510 Baby AT Case w/200W P.S. (3x5.25", 1x3.5")	$53.00
CS-109T Desktop Case w/230W P.S. (2x5.25, 1x3.5)	$56.00
CS-605T Mini Vertical Case w/230W P.S. (2x5.25", 3x3.5")	$54.00
CS-609M Mini Vertical Case w/230W P.S. (2x5.25", 3x3.5", Digital)	$56.00
CS-740 Mini Vertical Case w/230W P.S. (2x5.25", 3x3.5", Door, Digital)	$64.00
CS-760 Mid Vertical Case w/230W P.S. (3x5.25", 3x3.5", Door, Digital)	$86.00
CS-780 Full Vertical Case w/230W U.L.P.S. (4x5.25", 2HD, Door, Digital)	$117.00
CS-932 Mini Vertical Case w/230W P.S. (2x5.25", 3x3.5")	$52.00
CS-923 Mid Vertical Case w/230W P.S. (3x5.25", 3x3.5", Digital)	$72.00
CS-912 Full Vertical Case w/230W U.L.P.S. (4x5.25", 2HD, Digital)	$105.00
CS-836 MPC Desktop Case w/200W U.L.P.S. & 20Watts Speakers	$125.00
Diamond Series: (Black color model available +$3.00)	
CS-130 Full Vertical Case w/250W U.L.P.S. (4x5.25", 2HD, Digital)	$126.00
CS-230 Mid Vertical Case w/250W U.L.P.S. (4x5.25", 2HD, Digital)	$110.00
CS-330 Mini Vertical Case w/220W U.L.P.S. (2x5.25", 3x3.5", Digital)	$81.00
CS-530 Desktop Case w/250W U.L.P.S. (2x5.25", 2x3.5", 2HD, Digital)	$86.00
CS-730 Baby AT Case w/220W U.L.P.S. (2x5.25", 1x3.5, 1HD, Digital)	$81.00
CS-830 Slim Line Case w/220W U.L.P.S. (1x5.25", 1x3.5", 1HD, Digital)	$81.00
2nd Fan for Diamond Series cases (CS-130, CS-230, CS-530)	*$10.00*

PRINTERS

Canon BJ-10ex Bubble Jet Printer	$245.00
Canon BJ-200 Bubble Jet Printer	$325.00
Canon BJ-230 Bubble Jet Printer (Wide)	$408.00
Canon BJ-300 Bubble Jet Printer	$333.00
Canon BJC-800 Color Bubble Jet Printer	$1533.00
Canon BJC-820 Color Bubble Jet Printer (Wide)	$1647.00
Citizen PN-48 Notebook Printer (Professional)	$225.00
Citizen GSX-190 Printer (9pin/color option)	$159.00
Citizen GSX-230 Quiet Printer (24pin/270cps/color option)	$235.00
Citizen GSX-240 Quiet Printer (24pin/300cps/80col/color option)	$290.00
Citizen GSX-145 Printer (24pin/192cps/132col/color option)	$355.00
**** Color Kit for Citizen 200GX, GSX-230 or GSX-240*	*+$3.00*
Epson Action Printer 2250 (9pin)	$120.00
Epson Action Printer 3250 (24pin)	$179.00
Epson FX-870 Printer (9pin)	$275.00
Epson FX-1170 Printer (9pin, Wide)	$368.00
Epson LQ-570+ Printer (24pin)	$249.00
Epson LQ-870 Printer (24pin)	$455.00
Epson LQ-1070 Printer (24pin, Wide)	$365.00
Epson LQ-1170 Printer (24pin, Wide)	$625.00
Epson LQ-2550 Printer (24pin, Wide)	$930.00
Epson Action Laser 1500 (1MB, 6ppm)	$680.00
Epson EPL-8000 Laser Printer	$885.00
Panasonic KX-P1150 Printer (9pin/240cps/80col)	$139.00
Panasonic KX-P2023 Quiet Printer (24pin/240cps/80col)	$198.00
Panasonic KX-P2180 Quiet Printer (9pin/240cps/80col/color option)	$165.00
Panasonic KX-P2123 Quiet Printer (24pin/240cps/80col/color option)	$235.00
Panasonic KX-P2124 Quiet Printer (24pin/320cps/80col/color option)	$315.00
Panasonic KX-P2624 Quiet Printer (24pin/300cps/132col)	$380.00
**** Color Kit for Panasonic KX-P2180, KX-P2123 or KX-P2124*	*+$5.00*
Panasonic KX-P4410 Laser Printer (5ppm/512K/300dpi)	$549.00
Panasonic KX-P4430 Laser Printer w/SaintPaint (5ppm/1MB/300dpi)	$649.00
Panasonic KX-P4440 Laser Printer w/SaintPrint (10ppm/1MB/300dpi)	$1195.00
**** Please call for Panasonic Printer Accessories and Comsumables Products*	
Okidata ML320	$307.00
Okidata ML321	$430.00
Okidata OL400e LED Page Printer	$535.00
Okidata OL810 LED Page Printer	$920.00
Okidata OL830 Plus LED Page Printer	$1105.00
Okidata OL850 LED Postscript Printer	$1227.00
Hewlett Packard Portable Printer	$395.00
Hewlett Packard DeskJet 500 InkJet Printer	$350.00
Hewlett Packard DeskJet 550C Color InkJet Printer	$699.00
Hewlett Packard LaserJet 4L Personal Laser	$675.00
Hewlett Packard LaserJet 4	$1385.00
Hewlett Packard LaserJet 4M	$1925.00

KEYBOARDS

BTC 5339SX 101keys Keyboard	$25.00
Chicony KB-5181 101keys Keyboard	$38.00
Chicony KB-5311 101keys Keyboard	$23.00
Chicony KB-5911 Track Ball Keyboard	$63.00
Focus-2001 101keys Keyboard w/Hard Dustcover (Click)	$40.00
Focus-2001B 101keys Keyboard w/Hard Dustcover (Click)- Black	$45.00
Focus-6000 101keys Keyboard (Soft click)	$36.00
Focus-8000 111keys Keyboard (Calculator, Soft click)	$45.00
Focus-9000 128keys Keyboard (Programmable, Click)	$57.00
Fujitsu-4700 101keys Keyboard	$47.00
Fujitsu-4870 101keys Keyboard	$37.00
Honeywell-101WN 101keys Keyboard (3yr. warranty)	$40.00
KT-2000 101keys Keyboard (Keytronic made)	$36.00
MaxSwitch 101keys Keyboard	$36.00
MaxiSwitch 124keys Progammable Keyboard	$63.00

MISCELLANEOUS

Honeywell 3-button Serial Mouse	$42.00
Keytronic 400dpi Serial Mouse	$18.00
Z-Nix Serial Mouse	$13.00
Logitech Decoa Mouse	$24.00
Logitech Bus Mouse Man	$70.00
Logitech PS-2/Serial Combo MouseMan	$68.00
Logitech Trackman II (Serial)	$79.00
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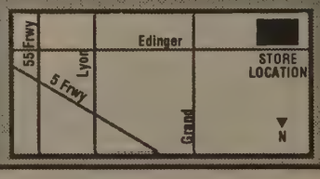

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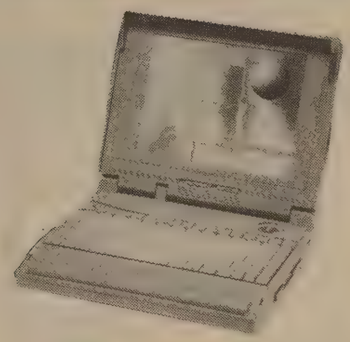

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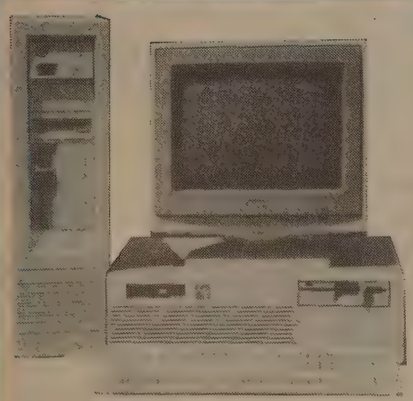

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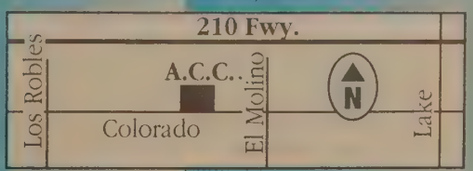

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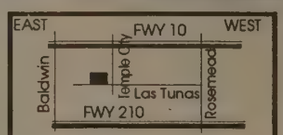

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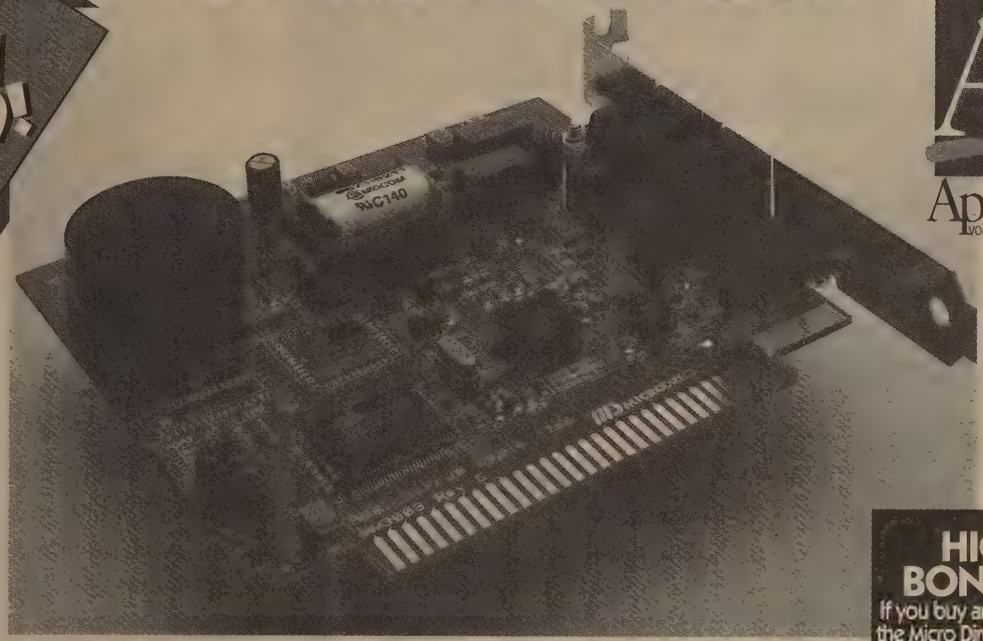

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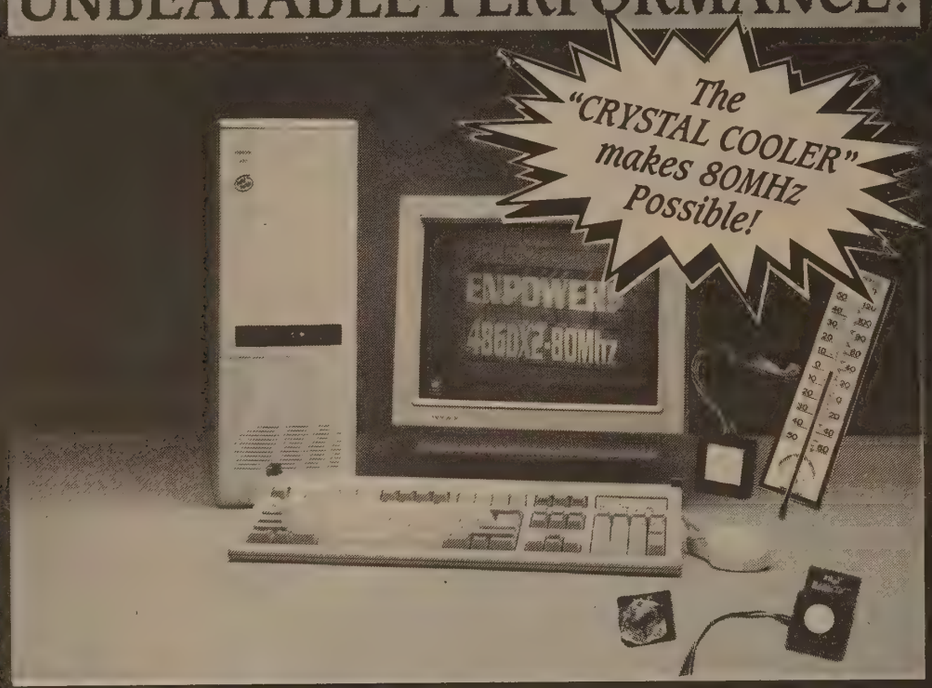

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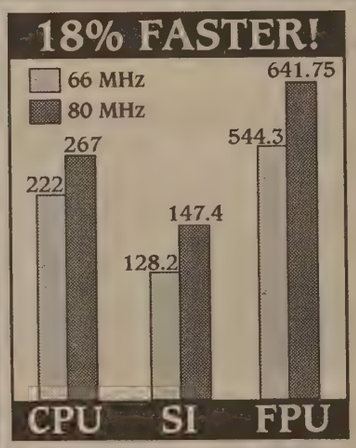

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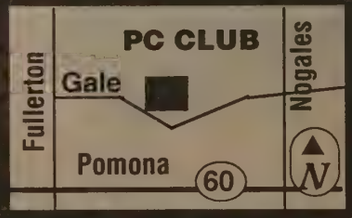

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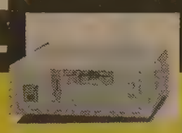

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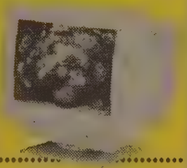

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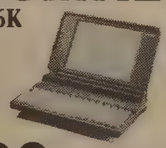

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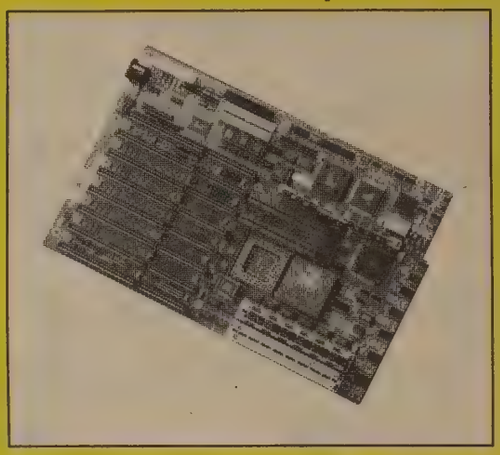

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HINT 486DX EISA-VLB w/256K cache w/ZIF socket . call
HINT EISA VLB M/Board has 3 EISA & 2 VLB slots

VESA Local Bus Video Cards & Controllers:
ATI VLB Mach 32 accelerator w/2MB VRAM $365
Cirrus Logic VLB accelerator w/1MB (exp. 2MB) . $90
Cirrus Logic VLB accelerator w/1MB (exp. 2MB) $118
w/built in 32bit Super IDE + I/O ctrl.
Diamond SpeedStar Pro VLB acceler. w/1MB $130
Diamond Stealth 24 VLB w/1MB $165
Diamond Stealth Pro VLB w/1MB $250
Diamond Viper VLB accelerator w/2MB VRAM ... $350
Orchid Fahrenheit VLB Win acceler. w/1MB $175
Orchid Celsius VLB accelerator w/1MB $235
Orchid P9000 VLB accel. (Weitek Chip) w/3MB . $350
VESA LB IDE ctrl. w/Multi I/O (2H/2F, 2s,p,g) ... $38
Promise 4030 VLB IDE Cache Ctrl. (exp. 16MB) . $140
Promise 420 VLB IDE w/AT I/O w/512K $150
Tekram DC-680 VLB IDE Cache Ctrl. (exp. 16MB) . $155
UltraStor 34F VLB SCSI Ctrl. (Bus Master) $275

H/F CONTROLLERS

MFM 1:1 H/F Ctrl $40
IDE 1:1 2H/2F Ctrl (Qty 20+ $9) $15
Super IDE 2H/2F w/AT I/O (Qty 20+ $11) $20
IDE 1:1 2H/4F Ctrl I-40 ..... $35
IDE 1:1 2H/2F Ctrl w/ROM (for Networks) $45
LongShine (LCS) ISA IDE Ctrl (16MB exp.) .. $150
(IBM/ZENIX/Novell Drivers +CAD) 4H/2F Super Fast
LCS EISA IDE Ctrl w/1MB Cache (16MB exp.) .. call
DTC 2290 EISA IDE Ctrl 4H/04FD, 8MB/sec $120
DTC 3290AS EISA to SCSI Cache Ctrl. . $395
ASPI comp. (host adapter, 4MB exp.)
DTC 3292 EISA SCSI Ctrl (non-cache) .. $330
ADAPTEC SCSI 1522/1522K $100/140
ADAPTEC SCSI 1542CK/1542CK+ $240/310
ADAPTEC SCSI 1742K EISA Bus Master $395
ADAPTEC SCSI 2742T EISA Bus Master $430
SCSI ADAPTEC OEM H/F Ctrl w/kit $125
Adaptec 1522K compatible
UltraStor 15C IDE Caching FD/HD Ctrl. w/0MB .. $195
UltraStor 14F SCSI FD/HD Ctrl. $220
UltraStor 24F EISA SCSI FD/HD Ctrl. $350
UltraStor 34F VESA Local Bus SCSI FD/HD Ctrl. $275
VESA LB Super IDE ctrl. w/I/O (2H/2F, 2s,p,g) $38
Tekram DC-680 VLB IDE Ctrl. (exp. 16MB) $155
Bus Logic KT-445S VLB SCSI Cntr. Kit $280
Bus Logic KT-542B ISA SCSI Cntr. Kit $280

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High Speed AT I/O (Qty 20+ $32) $38
(16C550 comp. 2 serial/1 parallel ports)
Printer card/Game card $8/9

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BTC 101 Enhance 5339 ..... $25
Life-On 101 ..... $35
Keytronic 101 KT2000 (USA) $45
Fujitsu 4700 101 ..... $45
Focus 2001 w/Dust Cover $35
F8000 111 Keys w/Calculator (soft) .. $45
Focus 9000 128 Keys w/Calculator $58
BLACK ACTi 101 Enh. k/b $42
BLACK Focus 2001 101 Enh. k/b $40

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12" Mono Monitor (Amber) $78
14" Mono Monitor (Amber or P.W.) .. $92
14" Mono VGA (P.W.) $105
14" CTX5468/Arcus SVGA (.28mm 1024x768) $255
14" Black Arcus SVGA (.28mm) $275
14" CTX 5468 N/Arcus 1448 SVGA Multisync $280
Non-Interlace (.28mm 1024x768)
14" CTX 1461 (.28mm 1024x768I 72Hz NI $305
14" Black Arcus NI (.28) 1024x768 Multisync $300
14" Infiniti 1439 /Sunshine 7A SVGA $195
(.39mm 1024x768)
14" Infiniti 1428 /Sunshine 7 SVGA $230
(.28mm 1024x768)
14" Infiniti N4 /Sunshine 8 SVGA $260
Non-Interlace (.28mm 1024x768)
14" Viewsonic 4E $275
Multiscan (.28mm 1024x768)
14" Viewsonic 5E $375
Non-Interlace (.28mm 1024x768) 72Hz Refresh
14" Viewsonic 6E $300
Non-Interlace (.28mm 1024x768)
15" MAG MX-15F (.28mm 1280x1024) $470
15" Viewsonic 6FS Multi Freq. F/S ..... call
(.28mm 1280x1024) 72Hz, Low Radiation
17" MAG MX-17F $895
17" Viewsonic 7 Multi Freq. F/S ..... call
"Top-Rated" (.28 1280x1024) Low Radiation
17" Mitac MTC731 ..... $560
Non-Interlace (.31mm 1024x768)
15" NEC 4FGE/ 17" NEC 5FGE $725/call
(.28 mm multiple frequency)
NEW! Viewsonic 15" / 17" / 20" ..... Call
(.28mm 1280x1024) 76Hz Refresh
20" Addonics Ultra 1280 Multi Frequency
(.31mm 1280x1024) ..... SPECIAL $1300

PRINTERS

Star NX-1001 Multi-Font (9pin/180cps/80col.) $138
Panasonic KX-P2023 (24pin/240cps/80col.) $195
Panasonic KX-P2180 (9pin/240cps/color option) $165
Panasonic KX-P2123 (24pin/240cps/color opt.) .. $235
Panasonic KX-P2124 (24pin/320cps/color opt.) . $308
Panasonic KX-P2624 (24pin/300cps/132col.) $378
Color Kit for KX-P2180, KX-P2123, KX-P2124 ... $45
Panasonic KX-P4410 Laser (5ppm/300dpi/512K) call

MATH-CO PROCESSORS

ULSI 387SX-25/33 ..... $50/55
ULSI 387DX-33/DX40 ..... $60/70
Intel 387XL-20/25/33 DX $80

CD ROM & ACCESSORIES

Mitsumi CRMC Int. CD ROM w/interface $170
BEST BUY Panasonic 562 w/interface $240
64K cache,dual speed, 315ms, 150/300KB/sek.,
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Multi-Session Kodak Photo CD compliant, SCSI-2
Creative Lab Sound Blaster Pro Deluxe $140
Creative Lab Sound Blaster 16/ASP $178/230
Media Vision Pro Audio Spectrum 16 Sound Card $185
Media Vision Pro Audio Studio 16 Sound Card $239
WinSound 16 Sound Card (16Bit stereo) ..... call
2"x3" Full Range Speakers $10
Stereo Speakers w/adaptor 80W $80

MICE & TRACKBALLS

KinKo Hi-res Mouse(Serial) CP3 NX $15
Truemouse TX/AX 300 (Serial) w/mouse pad .. $20
Truedox Trackball TR300 ..... $35
Logitech Oexxa Mouse $22
Logitech MouseMan $66
Logitech TrackMan II (Serial) $78
Logitech TrackMan Portable $105
Genius Portable Trackman ..... call
Microsoft Mouse Serial/Bus $65/75
BLACK F2 (Serial) Hi-res Mouse $25

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CONNER 30084 80MB IDE (17ms) $140
CONNER 30104 120MB IDE (19ms) $160
CONNER 30174 170MB IDE (17ms) $180
CONNER 30204 210MB IDE (12ms) $200
CONNER 32005 210MB SCSI (16ms) ..... call
CONNER 30254 251MB IDE (14ms) ..... call
CONNER 30544 540MB IDE (10ms) ..... call
CONNER 30540 540MB SCSI-2 (10ms) $550
CONNER 31370 1.3GB SCSI-2 (10ms) $900
FUJITSU 2624T 513MB IDE (19ms) 5 yr. warr. $565
FUJITSU 2624FA 513MB SCSI (12ms) 5 yr. warr. $585
FUJITSU M2266SA 1.2GB SCSI (14ms) 5 yr. warr. ..... call
FUJITSU M2652SA 2.0GB SCSI (11ms) 5 yr. warr. ..... call
MAXTOR 7120A 120MB IDE (15ms) $165
MAXTOR 7120S 120MB SCSI (15ms) $210
MAXTOR 7213A 210MB IDE (15ms) $200
MAXTOR 2135 213MB SCSI (15ms) $260
MAXTOR 7245A 245MB IDE (14ms) $230
MAXTOR 340S 337MB SCSI (13ms) $370
MAXTOR 340A 340MB IDE (13ms) ..... call
MAXTOR 534A 535MB IDE (13ms) ..... call
QUANTUM ELS127 120MB IDE (15ms) $175
QUANTUM 170QT 170MB IDE (15ms) ..... call
QUANTUM Q24A012 240MB IDE (13ms) ..... call
WESTERN DIG 240 84MB IDE (19ms) $165
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SEAGATE 351A 42MB IDE (28ms) $110
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Epson 1 2/1 44MB $48/43
Samsung 1 2/1 44MB $45/49
Teac 1 2/1 44 (Black available call) $50/45
1 44 with kit add $3
FD505 Teac 2 in 1 1 2+1 44MB FDD $128
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(Floppy Ctrl must be 2.88 compatible)

Minimum order $300 or Qty 10+. Call for Dealer Qty Discounts and other products (Printers, RAM, P.S.) prices.

TERMS: 1year warranty on parts & labor. Printers & monitors warranty thru manufacturer. All sales on CHIPS,MONITORS & PRINTERS are final. NO REFUND! All returns are subjected to our approval & must have prior authorization. Return items must be in good condition & in its original packing shipped prepaid & insured. All refunds or credits are less freight & bank charges. All refund items must be returned within 14 days of invoice. There will be a restocking charge of 20% after the 7 days period & within 30 days of invoice. Not responsible for any typographical errors. Price & availability subject to change without any notice. Prices are COD cash/cashiers chk.

RESOURCES

Calendar Of Events

CONFERENCES, SHOWS, AND OTHER SPECIAL EVENTS

NOVEMBER

November 2–4 Email World: The Mail Enabled Applications Conference & Expo. Santa Clara. DCI. Call: (508)470-3880.

November 3–5 InterTainment '93: Fifth Annual International Conference On Interactive Entertainment. Santa Monica. Alexander & Associates. Call: (212)684-2333.

November 6 Computer Show. Sherman Entertainment Center, Reseda. Computer Marketplace. Call: 1-800-800-5600.

November 6 Computer Show & Sale. Anaheim Stadium, indoors. Richard James Corp. Call: 1-800-685-1400.

November 6 NIC Fest '93. San Diego. InterNIC Information Services. Call: 1-800-444-4345.

November 7 Computer Show. Sequoia Conference Center, Buena Park. Computer Marketplace. Call: 1-800-800-5600.

November 7 Computer Show & Sale. Community Center, Oxnard. MarketPro Shows. Call: (415)388-8893.

November 7 Computer Show & Sale. Glendale Civic Auditorium. Richard James Corp. Call: 1-800-685-1400.

November 8 ATM TecForum. Orlando, FL. National Engineering Consortium. Call: (312)938-3500.

November 9–10 Broadband: Achieving The Promise Forum. Orlando, FL. National Engineering Consortium. Call: (312)938-3500.

November 11–12 Multimedia: Here And Now Forum. Orlando, FL. National Engineering Consortium. Call: (312)938-3500.

November 13 San Bernardino Computer Expo. National Orange Showgrounds, San Bernardino. Computer Attractions. Call: 1-800-400-7386.

November 13–14 Computer Show & Sale. CSU Northridge, North Campus. Richard James Corp. Call: 1-800-685-1400.

November 14–18 Fifth ACM Conference On Hypertext. Seattle, WA. ACM. Call: (206)292-0559.

November 16–17 The PC^2 Conference. Washington, DC. Telecommunications Reports. Call: 1-800-822-6338.

November 20–21 Computer Show With Computer Training Seminar. LA Fairgrounds, Pomona. Computer Marketplace. Call: 1-800-800-5600.

November 21 Computer Show & Sale. Scottish Rite Center, San

NOVEMBER 3–5

INTERTAINMENT '93: THE FIFTH INTERNATIONAL CONFERENCE ON INTERACTIVE ENTERTAINMENT

Santa Monica

The superstars of interactivity once again converge on the world of entertainment. InterTainment '93 explores the programming and content of the new interactive media universe. Executives from the technology, production, and entertainment fields, people working daily on the latest entertainment developments, meet to discuss games, children's programming, online communities, public place attractions, interactive television, and multimedia publishing. Several sessions will tackle the impact of interactive technologies on the traditional Hollywood community. Sponsored by Alexander & Associates, Inc., InterTainment '93 takes place at Loew's Santa Monica Hotel. Call: (212)684-2333.

NOVEMBER 6

COMPUTER SHOW WITH COMPUTER TRAINING SEMINAR

Reseda

Computer Marketplace computer shows feature over three hundred exhibits with thousands of products, and now include seminars open to all users—from the beginner to the advanced computer user. Shows are from 10:00 am to 5:00 pm. Admission is free. Sherman Entertainment Center, Reseda. Call: 1-800-800-5600.

NOVEMBER 6

A DEMONSTRATION OF MIDI BY OPCODE REPRESENTATIVES

Santa Monica

Representatives from Opcode will appear at West L.A. Music to demonstrate "The Opcode MIDI Starter Package." MIDI, which stands for musical instrument digital interface, is a standard that allows computers and musical instruments to interact. With a computer and MIDI software, users can synchronize notes played on several synthesizers into one musical score. They can also edit the music, edit only the drum score, or transpose an entire arrangement from one key to another. The demonstration will take place from 1 to 4 pm at West L.A. Music in Santa Monica. Call: (310)477-1945.

continued on page 143

Computer MARKETPLACE

"The Traveling Mall That Has It All"

COMPUTER TRADE SHOW
WHOLESALE PRICES
OPEN TO THE PUBLIC

10:00 to 5:00 p.m.

Over a hundred companies having price wars with each other to compete for your business. You can't find this much inventory in a hundred computer stores nor can you get these prices.

Pomona Shows
SEMINARS
300 EXHIBITS

SHOW DATES

November 6 Saturday
RESEDA - Sherman Entertainment Center **ADMISSION FREE!**
From 101 Freeway, take Reseda off ramp, turn left (if traveling East) on Reseda Blvd. to Sherman Way, turn right, one block to Canby Street. 18430 Sherman Way.

November 7 Sunday
BUENA PARK - Sequoia Conferencea Center Admission: $5.00
Take the Beach Blvd. Exit off the 91 Freeway, go one block North to 7530 Orangethorpe.

November 20 & 21 Saturday & Sunday
POMONA - Fairplex (L.A. County Fairgroungds) Admission: $7.00
Exit Highway 10 at Fairplex Drive. Go North to Mckinley, turn right. Turn Left on White Avenue to Gate 14.

December 4 Saturday
RESEDA - Sherman Entertainment Center **ADMISSION FREE!**

December 5 Sunday
BUENA PARK - Sequoia Conferencea Center Admission: $5.00

December 11 & 12 Saturday & Sunday
POMONA - Fairplex (L.A. County Fairgroungds) Admission: $7.00

Computer Training Seminars at all Pomona Shows!

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March 18, 19, 20, 1994

Plan to attend this exciting event!

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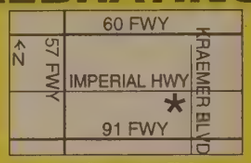

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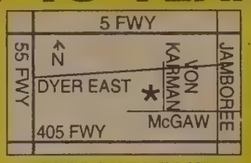

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Equipped w/ fast 200ms Toshiba CD ROM, best true 16bit stereo sound card & stereo speakers. Great for learning entertaining & as a personal productivity companion

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- Diamond Speedstar Pro 1MB VRAM
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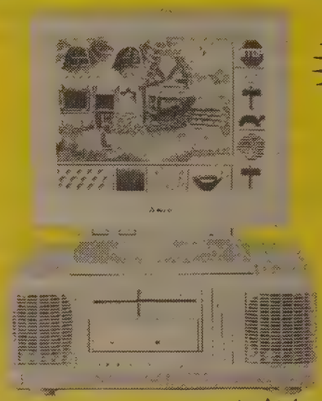
- Microsoft DOS 6.0 & Windows 3.1
- Mouse • Intel 96/24 Fax-Modem
- CD Softwares: Encyclopedia, US Atlas, World Atlas, Chessmaster 3000, Mavis Beacon Teaches Typing



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- Prima Quest IDE VLB • 101 Keyboard
- Diamond Stealth Pro 1MB VRAM
- Mitac XVGA Non-Inter. Monitor 1280x1024
- SoundSonic or Pro Audio Spectrum 16 Sd Card
- 30W per Channel Multimedia Stereo Spkrs.
- Microsoft DOS 6.0 & Windows 3.1
- Mouse • Intel 96/24 Fax-Modem
- CD Softwares: Encyclopedia, US Atlas, World Atlas, Chessmaster 3000, Mavis Beacon Teaches Typing

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- TEAC 50 CD ROM Dle. Spd., 265ms
- Pro Audio Spectrum, 16 Sd Card • Spkrs
- CD Softwares: Encyclopedia, US Atlas, World Atlas, Chessmaster 3000, Mavis Beacon Teaches Typing

CD ROM Bundles $75 Win.

1. – Encyclopedia, US Atlas, World Atlas, Chessmaster 3000, Mavis Beacon Teaches Typing

2. – Barron's Profiles, Languages of the World, Space Shuttle, Photo CD Access CD

3. – Storydisc & Coloring Book, The Animals!, Dinosaur Encyclopedia, Adventures of Willie Beamish

CD ROM Bundles $75 Mac

4. – Encyclopedia, The Animals!, US Atlas, World Atlas

5. – Family Doctor, Complete Shakespeare, Complete Sherlock Holmes, Audubon Birds, Audubon Mammals

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265ms, 300KB/sec transfer ..... $CALL
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16bit bus, 16bit DAC SCSI port $225
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MEDIA VISION Pro 16 MM System II NEC 84 CD ROM, 250ms, Pro Audio 16 ..... $890

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Capitol Hill	22	Guiness	28	Languages of the World	31
CD Deluxe	40	Oceans Below	23	Mavis Beacon Typing	22
Chessmaster	22	Space Shuttle	22	Profiles of American Colleges	14
Composer	25	Stellar VII	15	Chessmaster 3000	20
Desert Storm	23	King's Quest V	15	Jones in the Fast Lane	15
Dinosaurs	19	First Ed	34	Mixed Up Mother Goose	15
Encyclopedia	46	US/World Bus	23	Space Quest IV	15
Great Cities I or II	23	US/World Atlas	17	Willie Beamish	15

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Capitol Hill	23	Time Table Science	22	Voyage Planets 2	43
Color It	23	Guiness	28	Voyage Planets 3/4	43
Publish It	22	Oceans Below	23	Voyage Stars 1/2	43
Consulting Detective	23	Space Shuttle	23	Voyage Stars 3/4	43
Desert Storm	23	CIA Fact Book	20		
Interactive Story	20	Classic Collection	58	**BUNDLES**	
Encyclopedia	46	US History	28	MPC 1/2/3	75
Lucas Arts Game Pack	32	World Atlas	17	MAC 4/5/6	75

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- Mid tower case w/230W PS
- CPU Cooling Fan • Full burn-in
- 1 year parts & labor warranty

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- Micronics VLB Motherboard
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JT20 250MB para. pt	339
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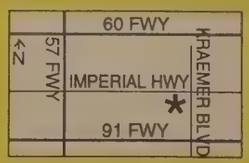

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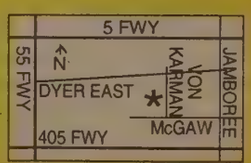

continued on page 143

Calendar Of Events continued

Diego. MarketPro Shows. Call: (415)388-8893.

November 27 Computer Show & Sale. Anaheim Stadium, indoors. Richard James Corp. Call: 1-800-685-1400.

November 28 ACP Computer Swap Meet. Santa Ana. ACP. Call: (714)558-8813.

November 28 Computer Show & Sale. Antelope Valley Fairgrounds, Lancaster. MarketPro Shows. Call: (415)388-8893.

November 28 Computer Show & Sale. Industry Hills Sheraton. Richard James Corp. Call: 1-800-685-1400.

November 30–December 1 Communicating Effectively With Help Desk Customers Seminar. Los Angeles. Help Desk Institute. Call: 1-800-248-5667.

DECEMBER

December 1–3 1993 Western Show: Definitely Not Business As Usual. Anaheim. California Cable Television Association. Call: (510)428-2225.

December 1–3 Successful GUI Migration Strategies And Effective GUI Design. Los Angeles. DCI. Call: (508)470-3880.

December 2–3 Successful Problem Solving Techniques Seminar. Los Angeles. Help Desk Institute. Call: 1-800-248-5667.

December 4 Computer Show. Sherman Entertainment Center, Reseda. Computer Marketplace. Call: 1-800-800-5600.

December 4–5 Computer Show & Sale. CSUN, North Campus. Richard James Corp. Call: 1-800-685-1400.

December 5 Computer Show. Sequoia Conference Center, Buena Park. Computer Marketplace. Call: 1-800-800-5600.

December 5–9 Lotusphere 1993: Lotus Notes Users Conference. Lake Buena Vista, FL. WALNUT. Call: 1-800-655-6887.

December 8–10 Client/Server World Conference And Expo. Chicago, IL. DCI. Call: (508)470-3880.

December 11–12 Computer Show With Computer Training Seminar. LA Fairgrounds, Pomona. Computer Marketplace. Call: 1-800-800-5600.

December 12 Computer Show & Sale. Orange County Fairgrounds. Richard James Corp. Call: 1-800-685-1400.

December 18 Computer Show & Sale. CSUN, North Campus. Richard James Corp. Call: 1-800-685-1400.

December 18 San Bernardino Computer Expo. National Orange Showgrounds, San Bernardino. Computer Attractions. Call: 1-800-400-7386.

JANUARY

January 10–13 Object World Conference. Boston, MA. IDG World Expo. Call: 1-800-225-4698.

January 17–18 Worldwide Electronic Commerce: Law, Policy, And Controls Conference. New York. ABA Section of Science and Technology. Call: (214)516-4900.

CLASSES, SEMINARS, AND WORKSHOPS

NOVEMBER

November 2 Workplace Issues Seminar Los Angeles. The Ergonomics Consortium. Call: 1-800-568-2211.

November 2–4 Client/Server Workshop. Los Angeles. DCI. Call: (508)470-3880. Code: L0C9XX.

November 6 Quicken For Windows Seminar. Los Angeles. Institute of Management Accountants, Greater San Gabriel Valley Chapter. Call: Jim Gibbs, (310)277-3614.

November 8 An Evening With Colossal Pictures. Los Angeles. The American Film Institute. Call: (213)856-7600.

November 11 Strange Bedfellows: Business Issues In Building New Media Collaborations Seminar. Los Angeles. The American Film Institute. Call: (213)856-7600.

November 15 An Evening With Apple PIE Los Angeles. The American Film Institute. Call: (213)856-7600.

November 20 Novell System Manager Class. Laguna Hills. Computer Education Institute. Call: (714)472-4192.

November 22 AutoCad Release 12 Class. Laguna Hills. Computer Education Institute. Call: (714)472-4192.

November 22 QEMM Memory Management Course. Santa Monica. DESQaway. Call: 1-800-LEARNDV.

November 22–23 WordPerfect 6.0 Class. Laguna Hills. Computer Education Institute. Call: (714)472-4192.

November 23 DESQview/X Training Course. Santa Monica. DESQaway. Call: 1-800-LEARNDV.

November 29 C & C++ Programming Class. Laguna Hills. Computer Education Institute. Call: (714)472-4192.

November 29–30 Ami Pro Class. Laguna Hills. Computer Education Institute. Call: (714)472-4192.

November 29–December 3 Macintosh Learning Extravaganza: 5 Days Of 144 Workshops. Anaheim. MacAcademy. Call: 1-800-527-1914.

DECEMBER

December 1 Client/Server Workshop. Los Angeles. Digital Consulting, Inc. Call: (508)470-3880. Code: L0C9XX.

December 1 Successful GUI Migration Strategies Seminar. Los Angeles. Digital Consulting, Inc. Call: (508)470-3880.

December 4 Free Class On How To Buy A PC. Santa Monica Library. Computer Classes Unlimited. Call: (818)441-5929.

December 13 QEMM Memory Management Course. Santa Monica. DESQaway. Call: 1-800-LEARNDV.

December 14 DESQview/X Training Course. Santa Monica. DESQaway. Call: 1-800-LEARNDV.

December 16 An Evening With The Next Generation Of Entertainment: Star Trek, Spectrum Holobyte, And Friends. Los Angeles. The American Film Institute. Call: (213)856-7600.

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The Racing BBS. (213)934-6026. 7-E-1, 2400. S. Ca. best source of winners. Free. [Exp. #115.]

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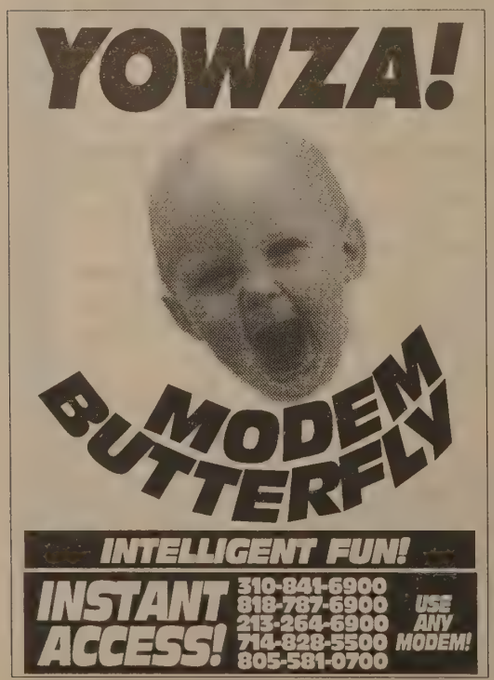

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BBS Spotlight

By John Wolcott

Journey To The Castle

The latest craze in BBS presentation is the Rip graphics format. The name almost sounds like it would do unspeakable things to your computer; but not so. Basically, using a Rip-compatible communications program to call a BBS that supports this format makes a BBS everything you've always wished it could be. Instead of the standard text presentation or even a multicolored ANSI graphics approach, Rip gives a crisp presentation of button-activated menus that work with a simple mouse click. "Impossible!" you say? Well, it's already here!

This month's BBS spotlight takes an in-depth look at a subscription BBS, The Castle BBS, that supports all of the software interface modes—regular text, ANSI, and Rip graphics—to create a pleasing presentation.

The Castle BBS, located in Silverlake, was started in March 1993 and grew quickly to become a popular BBS among the subscription boards. The two sysops, Vance Graham (alias Sir Vancelot) and Steve de Mena (alias Lord Fugitive), complement each other by combining public relations skills with programming and board maintenance. De Mena commented, "We wanted to offer the 'ultimate BBS'; and having had some prior sysop experience, pooled our talents to deliver just that." Both system operators pride themselves on being accessible to the board users and providing rapid responses to user communication needs.

The BBS runs on Galacticomm's MajorBBS software v6.12 with "add-on" programs to enhance its features. With forty-one incoming phone lines, supported by 2400 baud AMT and Boca Research modems and 14,400 baud US Robotics Sportster modems, The Castle is a busy place. However, you'll rarely, if ever, encounter a busy signal. Ten of the lines support 14,400 baud for your high-speed transfer pleasure. Plus, with multiple lines to call from surrounding areas, many parts of the greater LA area are a local call.

When you first connect, the system will want to know if you're running an ANSI or Rip graphics communication package. Next, new users will be asked the standard BBS registration questions. A trial membership account is set up which allows limited system use until you actually subscribe to the system.

The main menu offers practically any BBS feature you could ever want, including file libraries, online games, chat forums, who's online, public message boards, subscription information, electronic mail, questionnaires and matchmaking, and a "graffiti wall." If you're using Rip graphics software, you will be able to navigate through everything by clicking on buttons. If not, you're limited to keyboard commands. Either way, the menus are easy to understand and offer a very professional appearance.

The file libraries contain a surprisingly wide array of titles. Along with support for the standard download protocols, The Castle also supports Zmodem. If you haven't experienced a Zmodem download you're in for a treat—after giving the BBS the file download command, your system will automatically begin the transfer without having you first type in a file name or initiating a receive file command. If, for some unforeseen reason, the download is interrupted (e.g. your 5-year-old daughter unplugs the phone cord from your modem), you may reconnect to the

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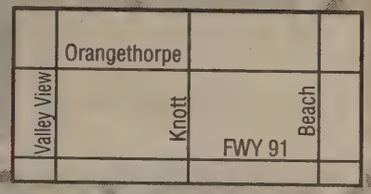

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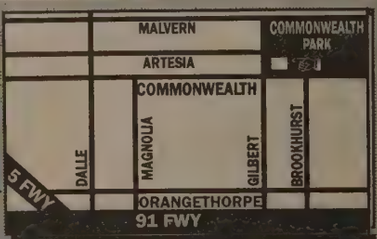

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Image Microsystems BBS. (310)815-8121. 8-N-1, 24 hrs., 2400/9600/14,400. Online tech support, customer support, order desk with weekly specials, software and hardware drivers. Non-customer access permitted. [Exp. #117.]

L.A. Masterplanner. (310)372-4050. LA's number one listing of charity and political events. [Exp. #116.]

Mac-HAC'ers BBS. (310)549-9640, 549-9664. 8-N-1, 24 hrs., 16,800. All computers, over 5GB of programs, six CD-ROMs, international mail. You validate yourself. Sysop: Bud Grove. [Exp. #117.]

Miller's Party Board. (310)815-0117. 300/1200/2400/9600/14,400. 32 lines, chat, MajorBBS, 4GB, shareware, nightly games. Free trial. Sysop: Jack Stern. [Exp. #115.]

Moroni BBS. (310)392-3981. 24 hrs., 300/1200/2400/9600. 15,000 shareware files plus an expanding section dealing with Latter-Day Saints. Free. [Exp. #117.]

One World. (310)372-0987. 300/1200/2400/9600/14,400. Ecology, gardening, health, alt.news, FidoNet, USENET, Internet. Free. [Exp. #115.]

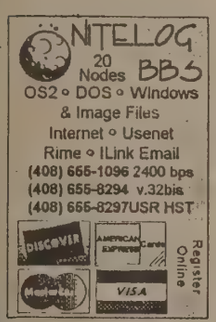
the original off off-broadway BBS. (310)453-7038. 8-N-1, 24 hrs., 300/1200/2400/9600. Non-subscription, text files/messages only. Using MajorBBS software and CompuCom Speedmodem. Sysop: James Gossage. [Exp. #115.]

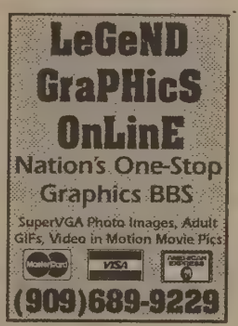
PS&A BBS. (310)374-9994. 8-N-1, 24 hrs., 14,400. Tons of IBM, Mac, and OS/2 shareware, CD-ROMS, Fidonet with echomail, and more. Free. Sysop: Paul Swanno. [Exp. #117.]

Rola-Tek's BBS Effects. (310)673-8976. 24 hrs., 2400/9600/14,400. GIFs, shareware files, and DOS utilities. Free downloads. [Exp. #117.]

Starlight BBS. (310)830-5798. International echomail, Paradox, Windows, OS/2, C++, programming, finance, and more. Free. [Exp. #117.]

TVTIX. (310)441-0693. Reserve free seats to LA's hottest TV shows. Type Go TVTIX. [Exp. #116.]





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All Disney BBS. (714)535-3559. 300/1200/2400/9600/14,400. Messages, job listings, Disneyana, classifieds, Westcot 2000. Sysop: Uncle Walt. [Exp. #117.]

Bits and Pieces BBS. (714)630-8897. 8-N-1, 24 hrs., 9600/14,400. Conferences, email, shareware files, forums, IBM, Amiga, two-line and more. [Exp. #116.]

Chamber Secrets. (714)589-2700. Adults only, 100% confidential, alt. lifestyles and relationships. No fee. [Exp. #115.]

Check Six BBS. (714)362-8299. 8-N-1, 14,400. Flight simulation files, utilities, SimNet. 714th TFW user group. [Exp. #117.]

Commodore Computing. (714)673-2185. 8N1, 24 hrs., 300/1200/2400. Supports C64/128. Free. Sysops: Stephen Fabre/Jay Darrow.[Exp. #115.]

CUGOC BBS. (714)545-3175. 8-N-1, 24 hrs., 1200–14,400. Free files and messages. Private section for paid Clipper User Group members. Sysop: Dave Avery. [Exp. #115.]

The CyberNet BBS. (714)378-0085, 378-0741. 2400–38,400. IBM and Amiga support, Empire contests, 2.5GB. Businesses advertise free. [Exp. #115.]

Internet Access. (714)377-9784. 14,400. UNIX, FTP, USENET, Telnet, IRC, full Internet services via T1. Over 2000 users nationwide. [Exp. #115.]

Lake Forest BBS. (714)770-5977, 770-0728. 8-N-1, 24 hrs., 1200/2400/9600/ 14,400/38,400. CD-ROM files, email, chat, Chinese character support forums. Sysop: Joe Hsu. [Exp. #116.]

Las Vegas Connection. (714)778-5317. Sports/horseracing, handicapping, Vegas info, and adult GIFs. Subscription. [Exp. #115.]

The PC Sports Connection. (714)533-6728. 8-N-1, 24 hrs., 300/1200/2400. Using Searchlight for unique

Continued

BBS Spotlight continued...

BBS, give the board your download command, and resume the download right where it left off. Isn't technology wonderful?

Your first order of business will probably be downloading the Rip graphics software. If you already have this software, you may want to download the icon software that will make this particular BBS work with your Rip software. From the file library menu, it's a one-letter or -button choice to download a Rip graphics communication package, a complete list of all files available for download, or an offline mail reader. Other files available for download include some Macintosh and Amiga support, but most files are of the IBM-compatible format with over 3GB of download titles. System hard drives and twelve CD-ROMs contain over seventy-five thousand files! Everything is virus-scanned before being posted, so computer virus surprises are unlikely.

Many of the standard board games such as backgammon and Yahtzee are available as well as fantasy games with intriguing titles such as Fazuul, Crossroads, Islands of Dawn, and Galactic Empire. With Rip graphics, several fantasy games can be played using mouse button clicks instead of painstakingly typing all of the commands the games would normally require. Be prepared to spend time here. You may easily lose yourself for hours as you explore these wonderlands.

The chat forums allow real-time interaction between system users who are currently connected. You may use a "global command" at any time to determine who is currently online and where they are on the BBS. Once you've learned who is where, you can page another user for a private chat or go to the main chat forum to participate in what is usually a lively discussion. The Castle also has regularly scheduled "Interlink" forums where users may chat online with other BBS system users, nationwide.

The public message boards also offer a wide range of topical discussions. You won't be able to actually chat live with the individuals who leave messages here, but will be able to maintain a running communication by leaving mail for others with your same interests.

Since this BBS supports MajorNet, communication by electronic mail (email) with computer users around the world is easily accomplished. All you'll need is the other user's email address. Later this month, The Castle is scheduled to begin Internet and Usenet email links.

The questionnaires and matchmaking menu choice will allow you to give personal information to other system users and match your attributes to others on the system. After you've answered the registry questionnaire, you'll be able to generate a list of the other system users and what percentage of your answers match theirs. You may also review the registry answers that any specific user has given. It's a great way to meet new people who share your interests.

The graffiti wall is an interesting place to visit. You'll see varied commentary on life's current issues. You may write a message on the wall anonymously or sign it with your name or alias within your message. Maybe you'll just choose to read what others have left.

The Castle BBS can be reached by calling (213)953-0040 for 2400 baud or (213)953-0073 for 14,400 baud with the standard protocols of 8-N-1. This BBS is an extraordinary value for your BBS subscription dollar. Subscription rates vary; with hourly or unlimited usage rates available. Information regarding subscription terms is available from the main menu. You are well advised to set up an unlimited time usage account; you'll spend hours of enjoyable modem time here! ■

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games, fantasy leagues, and sports talk. Sysop: Keith Jefferson. [Exp. #116.]

The Punkin Duster BBS. (714)522-3980. 8-N-1, 24 hrs., 2400/9600/14,400/16,800. RIME email, thousands of files, online games, multinode PC board 15.0. Sysop: Dave Ludwig. [Exp. #117.]

Shoot The Moon Music BBS. (714)995-1004. 8-N-1, 24 hrs., 14,400. Music, gifts. Sysop: Ken Hada; John Wackerman. [Exp. #116.]

805

The Brainstorm BBS. (805)584-6088. 2400/9600/14,400. Gigs, GIFs, interlink, online games, international messages, chat. Sysop: Eric Higgins. [Exp. #117.]

Real Estate Network. (805)298-2671. 2400. Free access to homes, agents, and software. [Exp. #117.]

818

Asian American BBS. (818)284-4519. 1200/2400/9600/14,400. Focus on cultural and business exchanges, serious and mature users only. Sysop: Gerald Fong. [Exp. #117.]

Child's Play BBS. (818)965-392f. 24 hrs., 14,400. An educational BBS, 25 door games and 5200 downloadable files. No adult files. [Exp. #115.]

Compendium Of Wisdom. (818)904-3403. 300/1200/2400. Dedicated to the Urantia book, cosmology, astronomy, philosophy, and more. Internet and FidoNet. [Exp. #117.]

Compu-Ad Information Network. (818)858-2763. 2400–19,200. Online real-time graphic listings of real estate, loan info, etc. Free. [Exp. #117.]

E-Qube BBS. (818)951-2796, 951-6097. 8-N-1, 24 hrs., 1200/2400/9600/ 14,400. Serving the engineering community. Online programs, offline mail, FidoNet. Sysop: Tom Honles. [Exp. #117.]

File Exchange BBS. (818)890-5678. 24 hrs., 300/1200/2400/9600/14,400. Registered Esterian Conquest. Over 4 Gigs of files online. No ratios. Download files on your first call. Sysop: Dennis Stover. [Exp. #117.]

Hard Drive Cafe. (818)993-5516. Mouse driven VGA, RIP graphics. Eight lines, Six CDs online, chat, multiuser interactive games. Other local phone numbers avail. [Exp. #115.]

Hottips BBS. (818)248-3088, 1200/2400/14,400. Five lines, 6000+ files, 1000+ users, 1GB online, QWK mail door, professional emphasis. RIME Network. Sysop: Michael D. Callaghan. [Exp. #117.]

InvestorLink. (818)331-4611. 24 hrs., 2400. Stocks, mutual funds, real estate, personal finance, updated daily. Free. Sysop: Steve Painter. [Exp. #116.]

KeyHole BBS. (818)545-0870. 8-N-1, 300/1200/2400. Bring your Mac, UNIX, DOS questions or problems to us for a solution. Free. [Exp. #117.]

Kimo's Kinky Korner BBS. (818)858-0098. 2400/9600. Adult BBS, adult networks and files, echoing dove-net, quest-net, and kimo net. Fee. Sysop: [Exp. #116.]

Koncept BBS. (818)830-8467. 24 hrs., 9600. 30-day free trial. Used by SPCA, Marine Animal Services. Pay for extras. Sysops: David Pacifico and Larry Hess. [Exp. #117.]

The Patchbay BBS. (818)441-3965. 8-N-1, 300–38,400. MIDI, Win3, graphics files. First call access. Free. Sysop: Daniel Bise. [Exp. #117.]

Personal Computing University BBS. (818)953-9063. 9600. Mycroft T&J Door game distributor. Tech support bulletins, DOS and Windows shareware, utils, and adult GIFs. $10 annual fee. [Exp. #115.]

Southland Matchmaker. (818)793-9108. 14,400. Internet email, usenet groups, MUD, chat. Enter "mm" at login prompt. Sysop:@atrium.ucm.org. [Exp. #117.]

The Sprawl. (818)342-5127. 8-N-1, 24 hrs., 300/1200/ 2400/9600. Civil liberties, electronic publishing, data encryption, Fidonet, free full access. Sysop: John Schofield. [Exp. #116.]

Tin Shack BBS. (818)992-3321. 14,400. Over 1.5GB of files. Free. Sysop: Guy Nohrenberg. [Exp. #115.]

Valley Computer Club BBS. (818)999-0925. 8-N-1, 1200/2400. Sysop: Jeff Woolf. [Exp. #116.]

909

Legend Graphics Online. (909)689-9229. Super VGA photo images, adult GIFs, video-in-motion, MoviePICs, instant sameday upgrading. Sysop: Joey Marquez. [Exp. #115.]

ASSOCIATIONS

Computer Language Society. Meetings: 3rd Wed., 7:00 pm, Veterans Memorial Building, Room A, Overland and Culver, Culver City. Call: Bill Sharpe. (310) 451-9598. [Exp. #119.]

Independent Computer Consultants Association, Los Angeles Chapter. Meetings: 1st Thurs., 6:00 pm. Prepaid reservation, $25, or at the door, $35. The LA chapter provides referral services. Call: (213)872-1811. [Exp. #116.]

Orange County Independent Computer Consultants Association. Call: (714)552-2384. [Exp. #116.]

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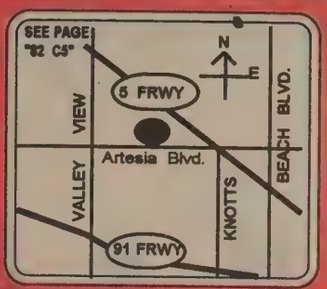

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Multimedia:

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Media Pack # 1:
Sound Commander Pro Multimedia Upgrade Kit.....**$ 375**
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(Panasonic CD-ROM Drive(390ms), Sound Blaster Pro Card, a pair of speakers and 5 CD Titles)

Network products:

Netware V3.12 5 Users.....$699.00
NetWare V3.12 10 User.....$1345.00
NetWare V3.12 25 User.....$1950.00
NetWare V4.0 5 User.....$930.00
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MAG Monitor:
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17" (MX17F),1280x1024,72hz,.28...$965

Shamrock Monitor:
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14" (1451),1024x768,SVGA .28dp...$235
14" 1024x768,Non-Interlaced,.28dp.$265
14" N-I VESA Std.1280x1024,.28....$290
15" N-I Flat Screen,1280x1024,.28...$395

Misc:

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120/250MB Tape Cartridge.....$18
2400 Internal Modem.....$30

96/96/24 FAX Modem.....$55
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AT SuperIDE w/IO(2S,1P,1G) Controller..$17
VESA Local Bus IDE Controller....$45
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USER GROUPS

ACCOUNTING

ACCPAC & Open Systems Users Group. Meetings: 7:00 pm. Irvine. Speakers and Demos Call: (714)962-4760. [Exp. #115.]

M*A*S90 User Group. Meetings: 3rd Wed., 6:30 pm, 22952 Alcalde Dr., Suite 130, Laguna Hills. Call: Ron Jacobs, (714)583-0424 x151. [Exp. #119.]

AMIGA

Amiga Friends User Group. Meetings: 3rd Sun., 1:00 pm, Ocean View High School at Warner and Gothard, Huntington Beach. [Exp. #119.]

Amiga User Group Of Long Beach. Meetings: 1st Thurs., 7:00 pm, 5373 E. Second St., Belmont Shores (in the Fire Station Bldg.). Call: Larry, (310)429-0752. [Exp. #117.]

ATUG—San Gabriel Valley. Meetings: 3rd Sat., 11:00 am, First S. Baptist Church, 4856 N. Golden W., Temple City. Call: Steve, (818)285-6424. [Exp. #115.]

LAAUG—Los Angeles Amiga User Group. Meetings: 3rd Wednesday, 7:30 pm. Veteran's Memorial Auditorium, Overland Ave. & Culver Blvd. Super SIGs, PD disks. Call: Kip Hammond, (310)390-3010. [Exp. #118.]

SCAUG—Southern California Amiga Users Group. Meetings: 1st Tues., 7:30 pm, 2nd Floor, Huntington Hall, St. Thomas of Canterbury Episcopal Church, 5903 Arbor Road, Long Beach. Call: (310)630-2712. [Exp. #119.]

South Orange Commodore Klub—SOCK. Meetings: 3rd Sat., 9:00 am, Computer Guild, Ste. 1003, 24001 Via Fabricante, Mission Viejo. New Location. Supports Commodore and Amiga, new users SIG. Call: Don, (714)830-2430. [Exp. #115.]

APPLE

CHOMP. Meetings: 4th Thurs. 7:30 pm, Cal Poly Pomona. Question and answer, raffle of useful software, opportunity to purchase disks. Call: Craig Richards (909)985-7385. [Exp. #119.]

Orange Apple Computer Club. Meetings: 1st Sat., 9:00 am, Orange Coast College, Chemistry Lab. Apple II supported, presentations, and disk of the month. Call: (714)770-1865. [Exp. #115.]

Original Apple Corps, Apple II User Group. Meetings: 2nd Sun. Support for beginners through experts. Write: PO Box 90065, Los Angeles, CA 90009. Call: Fred Duffy, (310)475-8400. BBS: (310)454-4660. [Exp. #115.]

ATARI

Atari Computer Association Of Orange County. Meetings: 2nd Sun., 12:30 pm. Fullerton Savings, 12860 Euclid, Garden Grove. Open to the public. Call: Tom Mynar, (714)960-6111, after 7:00 pm. [Exp. #116.]

ATESIG—Atari 8-Bit SIG. Meetings: 145 Surf Pl., Seal Beach. Cooperative group for Model Railroad applications. Call: (310)430-5433. [Exp. #116.]

South Bay Atari Computer Enthusiasts (SPACE). Meetings: 2nd Tues., 7:30 pm, Lomita VFW Hall, 1865 W. Lomita Blvd. Active in all user interests since 1981. Call: (310)375-4839 (10am–10pm). [Exp. #119.]

CD-ROM

CD-ROM SIG. Call: Bill Fisher, (714)241-0601, ext. 11. [Exp. #118.]

CLARISWORKS

ClarisWorks User Group. Supports both Macintosh and Windows. PO Box 701070, Plymouth, MI 48170. Call: (313)454-1969. [Exp. #117.]

CLIPPER

Clipper User Group Of Orange County. Meetings: 4th Thurs., 7:00 pm, Irvine Host Hotel, 1717 E. Dyer Rd., Santa Ana. Call: Bruce Jones, (714)960-9680. [Exp. #118.]

COMMODORE

Aldus/DTP Users Group. Share ideas and gain knowledge about the standard page layout and graphic design programs on the market. Call: Dave Casad, (310)370-6269. [Exp. #115.]

South Bay Commodore Users Group. Meetings: 3rd Thurs., 7:00 pm. SEC Redondo Generating Station, 1100 Harbor Dr. (across from King Yatch Harbor). Support for 64/128 computers. Open to all users of Commodore Computer equipment and those who would like to receive or exchange information on programs, applications, or hardware. Call: (310)324-8357. [Exp. # 119.]

DESKTOP PUBLISHING

Southern California Ventura Publisher User Group (SC–VPUG). Meetings: Last Tues. 7:00 pm, Glendale Federal Bank, Carillon Room, 401 N. Brand Blvd., Glendale. Product demos, Q & A's, library resources. Call: (818)955-5830. [Exp. #119.]

EPSON

Epson UG/Orange County. Meetings: 3rd Sat, 10:00 am, 2151 Michelson near JW Airport, Irvine. QX, PX, CP/M, VALDOCS—support, tech, periodical & disk library, and parts. Call: (714)893-3305 [Exp. #115.]

IBM & COMPATIBLES

Greater South Bay PC User Group. Meetings: 2nd Thurs., 7:30 pm, Christ King Lutheran, 2706 W. 182nd St., Torrance. Visitors welcome. Call: (310)329-2804. [Exp. #115.]

Long Beach IBM PC And Compatibles User Group. Meetings: 3rd Wed, 7:00 pm, Masonic Temple, 1120 E. Market St., Long Beach. Novice and experienced welcome. $25/yr, $35 for a family. Call: Jim Wells, (310)439-7114. [Exp. #119.]

Los Angeles Computer Society. Meetings: 2nd Tues., 7:00 pm, Culver City High School. Live presentations and giveaways. Meetings are free. Call: (310)471-2726. [Exp. #116.]

Microlink PCUG. Meetings: 1st Sat., 6:00 pm, La Habra Sr. Center, 165 E. La Habra Blvd., La Habra. Beginners and experts welcome. Free SIG classes. N. Orange Co./San Grabiel Valley. Call: (818)961-6214. [Exp. #115.]

Orange County IBM PC Users Group. Meetings: 2nd Tuesday, 6:30 pm. Computer Learning Center, 1240 S. State College Blvd., Anaheim. Speakers, software, newsletter. Open to public, all welcome. Call: (714)990-0580 [Exp. #115.]

Public Domain Users Group. 1000s of programs for IBM, Commodore, and CP/M computers. For free catalogue write to: T&T Shareware Marketplace, P.O. Box 390644, San Diego, CA 92149. [Exp. #119.]

San Bernardino Personal Computer User Group. Meetings: Last Wed., 7:00 pm, CSU, San Bernardino, Pfau Library Bldg., Rm. PL-8. Call: Arthur Saltzman, (909)880-5755. [Exp. #118.]

Southwest PC User Group. Meetings: 3rd Sat., call for location, or write: PO Box 78785, Los Angeles, CA 90016. Call: Christine Tripp, (213)935-4105. [Exp. #117.]

Thousand Oaks Personal Computer Club (TOPCC). Meetings: 4th Thurs., 6:30 pm, Goebel Senior Adult Center, 1385 E. Janss Rd., Thousand Oaks. Call: (805)523-1924. [Exp. #119.]

TUG-NET. Meetings: 1st three Thurs., 7:00 pm, Tektronix Corp., 21300 Erwin St., Woodland Hills. Enter through back door of building, press buzzer. Call: (818)249-1629. [Exp. #117.]

Valley Computer Club. Meetings: 1st Wed., 7:00 pm, Burbank Board of Realtors Bldg., 2006 W. Magnolia, Burbank. BBS, PD library, SIGs, newsletter. All welcome. Call: Wes Arnold, (213)221-4433; or Grayce Hruda, (818)842-3707. [Exp. #119.]

KAYPRO

KAYOS Kaypro User Group. Meetings: 4th Mon. of even months, 6:00 pm, El Segundo Library. Call: (310)379-8339. [Exp. #115.]

MACINTOSH

Los Angeles Macintosh Group (LAMG). Meetings: 3rd Thurs., 7:30 pm, Dept. of Water & Power, 111 N. Hope St. So. Cal's largest all-Mac user group meetings, monthly magazine, classes, PD software, and more. Call: (310)278-LAMG. [Exp. #115.]

Orange Apple Computer Club, Macintosh User Group. Meetings: 1st Sat., 1:00 Pm, Chemistry Lab, Orange Coast College. Presentations and club disks. Call: (714)770-1865 [Exp. #115.]

Original Apple Corps, Macintosh User Group. Meetings: 2nd Sun. Support for beginners through experts. Write: PO Box 90065, Los Angeles, CA 90009. Call: Fred Duffy, (310)475-8400. BBS: (310)454-4660. [Exp. #115.]

South Bay Apple Macintosh User Group. Meetings: Last Wed., 7:30 pm, Pacific Elementary School, 1214 Pacific Ave., Manhattan Beach. Call: (310)644-3315. [Exp. #115.]

MULTIMEDIA

Multimedia Audio Technology Group. Multiple platform, multimedia audio presentations. Call: Chris Palmer, (818)364-2577. [Exp. #116.]

The International Interactive Communications Society, LA Chapter. Meetings: 7:30 pm, Electronic Cafe, 1649 18th St., Santa Monica. Free for members, $10 for non-members. Call: (310)535-1293. [Exp. #116.]

NEXTSTEP

Southern California NeXTSTEP User Group. Meetings: throughout LA County. Call: Mike Mahoney, (310)985-1550. Email: mahoney@csulb.edu. [Exp. #116.]

PROGRAMMING LANGUAGES

APL User Group—SoCal SIGAPL. Meetings: 2nd Wed., Los Angeles City College. Membership includes newsletter. Call: G. Smith, (818)716-6271. [Exp. #119.]

Business BASIC Users Of Southern California (BBUSC). Meetings: 6:00 pm, Cerritos Sheraton, Cypress Rm., 12725 Center Court Dr., Lakewood. An executive forum for business solutions using Business Basic software. Call: Christian Brantley, (714)379-5454. [Exp. #115.]

San Fernando Valley C++ User Group. Meetings: 7:00 pm, HP Bldg., Van Nuys. Speakers, discussions, demon., etc. on C++ and OO technology. Call: (818)332-8879. [Exp. #116.]

The Software Toolsmiths. Meetings: Last Sat., 10:00 am, Joslyn Center, 339 Sheldon St., El Segundo. Discussions and tutorials on programming. Neophytes welcome. Call: John LuValle, (818)797-1820, or Howard Rogers, (310)532-3342. [Exp. #118.]

SGML

SGML (Standard Generated Markup Language) User Group, Southern California Chapter. Discussions, presentations, tutorials, networking, and educational forums applying to SGML. Call: Roger Watson, (310)337-0309. [Exp. #116.]

VIRTUAL REALITY

Virtual Reality Special Interest Group (VRSIG). Meetings: The Electronic Cafe, 1649 18th St., Santa Monica. Call: Dave Blackburn, (310)545-0369. [Exp. #115.]

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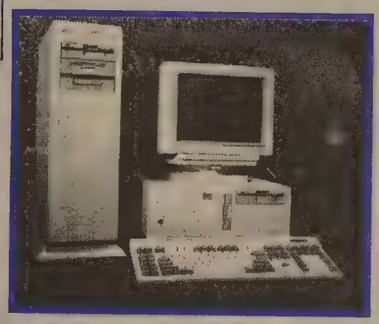

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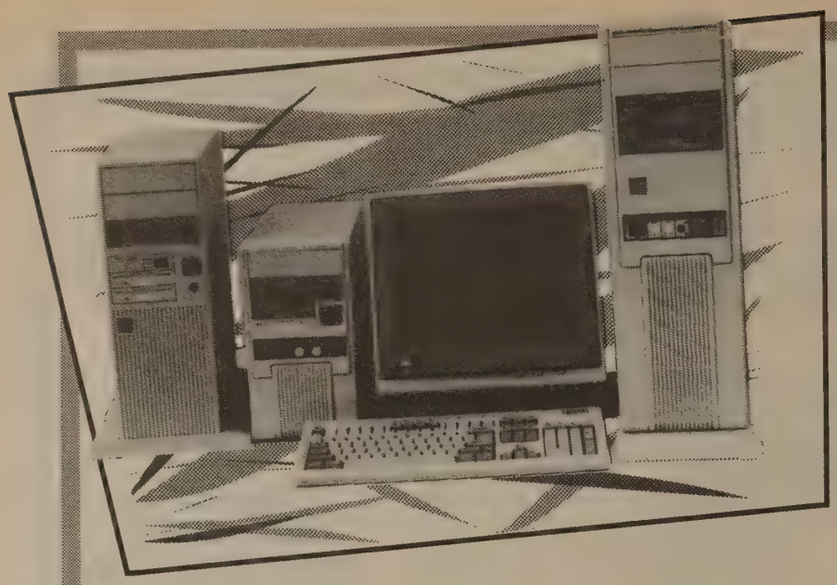

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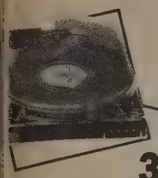

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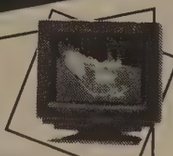

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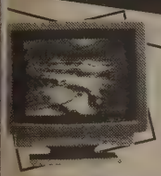

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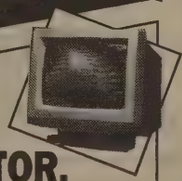

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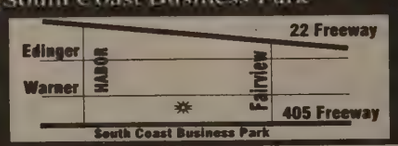

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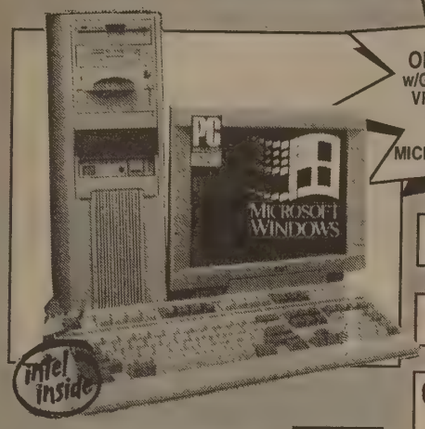

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VISA MasterCard

continued from page 51

Thick or Thin, that has an AUI port.

Either version of EtherWave has a pair of RJ-45 connectors for input and output. Wherever you could connect a single workstation, you can connect one of these segments. Each segment can connect up to eight nodes, and the length of the segment is limited by the standard 10BaseT limit of 100 meters to a hub.

For a small network of eight or fewer nodes, you could actually use these transceivers without a hub. Substitute it in applications in which you might otherwise use something like Farallon's Ether10-T Starlet minihub. And since it isn't necessary to calculate repeater counts, a much less sophisticated user can install EtherWave.

Larger webs can benefit, too, from the preservation of existing equipment. For example, you can greatly expand them without replacing hubs, even if you've reached the limit of your hop count. An old eight-port hub alone could support up to fifty-six workstations using EtherWave.

Surprisingly, Farallon claims that you don't pay a penalty to use its technology. Performance isn't impacted because EtherWave strictly complies with the 802.3 specification.

Of course, you're not limited to using EtherWave products with portable computers. Farallon makes a complete line for PCs and Macs of every stripe—even for printers. The adapter for PowerBooks, for instance, also works for any Mac without an available slot. A printer adapter likewise connects any LocalTalk printer to a 10BaseT network. The Newton adapter plugs into the Newton's communication port. ■

Portable machines can pose logistical problems when they return from the field:

Where do you put them?

continued from page 36

applications on a removable ROM card is that they can be easily upgraded.

While you can run standard software on this small computer, its design incorporates hot keys for each of the built-in applications. To access any of them, simply press the appropriate hot key. You can smoothly shift back and forth between the different applications, without losing your work, by hitting the hot keys. This means that you can work on a report or letter, shift to the phone book, then recalculate something in a spreadsheet, and return to the word processing document. It is advisable to save from time to time, but the applications and data will stay in memory just as you left them. Even when you turn the computer off, everything will stay in place. Turn the computer on and you will be exactly where you were at the end of the last session.

Hewlett-Packard has solved the mouse problem by building in a device that works just like a mouse, but is actually a little different. You press a button located on the right side of the machine, just above the keyboard. Out pops a wireless device that you move around like a mouse. The difference is that you do not need a surface to roll it on. This makes working on your lap easy. Also, it seems a lot better than most of the trackballs I have used.

While Excel and Word for Windows need no further comment, the phone book left something to be desired. I have tried from the earliest days of my computing to never have to reenter a phone list. Through different word processors, operating systems, and computers I have been successful. But this HP phone book does not have an import or export function. This is a serious weakness. There is a provision for bringing in lists from the HP 95LX. But even this was problematic as the addresses were placed in the note section rather than in the address field.

There is not floppy drive with the OmniBook 300. From the beginning, HP decided this was not supposed to be a standalone computer that would be your only machine. Instead, they correctly saw this as something to be used in conjunction with a desktop PC. To this end, they included a cable for connecting to the serial port of a host machine. You can transfer files between the desktop and the OmniBook by using LapLink Remote which works wonderfully.

With so much software built into the OmniBook, there is practically no need for a floppy drive. I found it easy to transfer essential files to the OmniBook.

In the flash card configuration, there are two PCMCIA slots that let you plug in a variety of devices. HP offers a communication package ($379) that includes a fax/modem card with Microsoft Mail 3.2 and WinFax LITE as well as DynaComm communications software.

I could spend more time describing all of OmniBook 300's features, but it is enough to say that if you regard a portable as a satellite to a larger computer, this is the one to check out. In addition to the Hewlett-Packard quality we are used to, they also provide unlimited free support for both hardware and software problems. ■

INFRARED CONNECTIVITY

Just as I prepared to turn in this column, I learned of two products for the OmniBook 300 that enhance its value. In my coverage, I did not have space to mention that in addition to serial and parallel ports, there is an infrared port by which you can send and receive data. While this sounds great, there have been few opportunities to utilize this feature.

Now, Extended Systems lets you take advantage of the infrared interface with the JetEye PC and JetEye. The JetEye PC attaches to the serial port on your PC and provides an infrared link with the OmniBook. After installing the JetEye PC, simply hold the OmniBook next to it and press the appropriate keys to transfer files. It takes advantage of the LapLink Remote software, but works without a hard wired connection.

The second product from Extended Systems, JetEye, works with a variety of Hewlett-Packard products in addition to the OmniBook. You can print files to either an HP LaserJet, DeskJet or DeskJet portable printer through the infrared port. Attached between the printer and the desktop PC, JetEye lets you print from your desktop as well as directly from the OmniBook without changing any of the cables. JetEye acts as a double input port to the printer.

I have used the comparable device which Extended Systems made for the HP 95LX, Hewlett-Packard's original palmtop computer, and it worked like a dream. I am sure this new model offers the same ease of use and convenience.

—Ed Kahn

Opulent Fauna, by Bill Niffenegger, is a computer generated painting that utilizes small samplings of nature photography.

© 1993 Bill Niffenegger/Chicago

Kai's Power Tools and the KPT Community

Devoted Users Of Kai's Power Tools Meet In Special America Online Forum

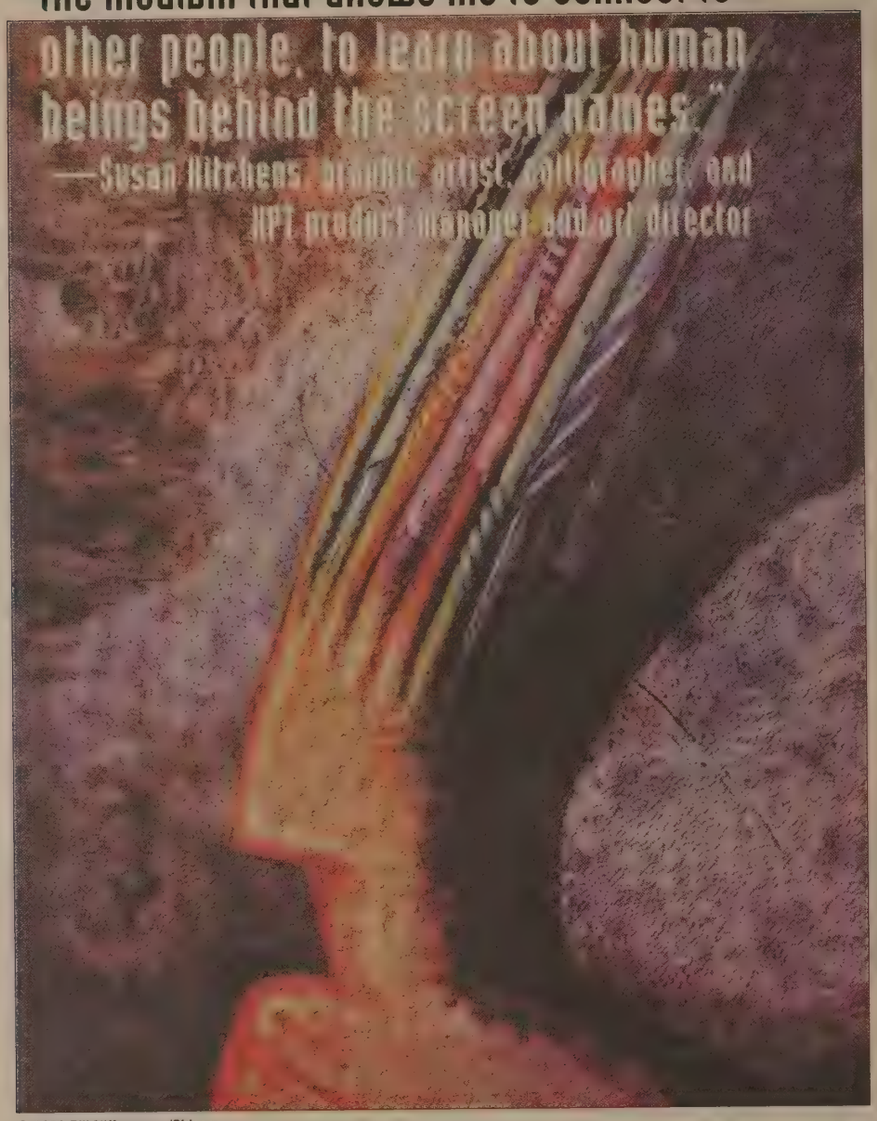
BY CHRIS OKON

Like most artists, a digital artist will use a variety of tools—whatever it takes—to render a personal vision. Adobe Photoshop, Fractal Design Painter, Stratavision Infini-D or Micro Frontier ColorIt are just a few names batted about by artists exploring the digital domain. Say KPT, though, and you're talking about more than a graphics program. You're talking about community.

KPT, or Kai's Power Tools, are a set of thirty-three powerful Macintosh plug-in 24-bit extensions that enhance and simplify the special effects capabilities of most graphics programs that follow the Adobe Photoshop standard. Produced by HSC Software of Santa Monica, CA, KPT includes filters and generators for exploring and designing textures, fractals, gradients, and other special effects. KPT v2.0, due for release by early November,

Copyright © 1993 by Chris Okon. All rights reserved. *Chris Okon is a San Francisco freelance writer specializing in multimedia and telecommunications issues.*

"I found my perspective changing with the medium that allows me to connect to other people, to learn about human beings behind the screen names."
—Susan Kitchens, graphic artist, calligrapher, and KPT product manager and art director



© 1993 Bill Niffenegger/Chicago

Regalia, by Bill Niffenegger, uses digitally created textures to give the piece a rich tactile feel that belies its computer produced origins.

promises faster performance, real-time previewing and an interface that is even more direct and inviting than v1.0's. Current users of KPT will see improvements in the image extraction preview, apply modes, transparency controls, keypad control and documentation as well as additions to the Gradient Designer, Fractal Explorer, Texture Explorer, and Path Gradients extensions. A Windows version is in the works.

KPT's interface invites you to explore the back alleys and secret paths of color and light that can appear on a color monitor. Underneath, though, is a powerful algorithmic engine that enables complex graphical manipulations. Without something like KPT, you would have to tweak curves, set levels, and work by trial and error to get the color values and effects you wanted. (One filter in particular, Video Cyclone, cycles an image through a seemingly endless progression of color palettes and acts as a kind of "what-if" presentation of color schemes. Watching this happen is mesmerizing, and delightful.)

KPT ONLINE FORUM

Kai's Power Tools are cool, no doubt about it. But talking about the tools as tools is only the beginning of a story that begins and continues online in a virtual community of people who use KPT. Online product forums are not new. The KPT forum, though, is unique. Residing on America Online, it invites people to proclaim and share ideas, questions, solutions, philosophies, tricks, and epiphanies about art and expression. Several folders hold discussions: Blue Sky Theories, General Novice Q&A, General Ramblings, KPT Tips and Tricks, a KPT Wish List and more. Some folders discuss KPT with specific programs like Photoshop, Premiere or ColorIt. The Geo Directory contains information about individuals that makes it easy for birds of a feather to connect. The Blue Sky folder, for example, addresses the world beyond KPT—the future of art, society, and ethics.

KPT TOOLS AND COMMUNITY

The Kai of Kai's Power Tools is Kai Krause, a longtime pioneer of computer graphics who is known for pushing available technology beyond its perceived limits. As someone who became an early master of Adobe Photoshop, he began posting his tips and techniques for Photoshop on America Online a few years ago. The tools, the joint inspiration of Kai and algorithm-wizard Ben Weiss, evolved from the tips.

The forum Kai's Power Tips for Photoshop was the beginning of a virtual community of people who were using digital tools in their art. Kai used online technology to bring like-minded people together. He once made a list of the women who were participating in the Photoshop forum, sent them all a note asking them to introduce themselves, and

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asked them to "Reply to all." The result was an instant Photoshop Women's Forum as each woman learned about the others. In the KPT chats, Kai (or AFC Kai, as he is known on AOL) continues to make connections, and voilà, a virtual community emerges:

AFC Kai : hey everyone, especially the new faces, introduce yourself in a line or 5.....
AFC Kai : that way you can start talking to each other (click people button stretch window and message who
AFC Kai : you like)
AFC Bill : < Bill - Chicago Computer graphics artist....move millions of pixels
LeeVaris: <— photographer, movie posters video boxes KPT art
Croton : Kyle - just graduated college with BFA in fine arts, now I'm looking for work
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MGould : <—independent video producer and computer artist.
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Filentropy : <—-Production Artist, CD-ROM developer and Photoshop junkie
JMSBND007 : <—-Illustrator/Graphic Designer/Photoshop Nut/ self taught juggler/ magician!
KMcGreggor : <— Quiet, subdued banjo player. Occasional write graphics software for some computers.

AFC Bill, for example, is Bill Niffenegger, a Chicago artist who first met Kai Krause a few years ago in the AOL Photoshop forum. "We started talking. We exchanged disks. I sent him a Syquest cartridge with my work and said 'Take a look at this.' And he did the same. I have the 0000.1 version of KPT," says Niffenegger, who uses KPT in his work in addition to many other tools. "I'll use KPT to make a nice background, for example, or to play with texture or bring out highlights. There's a wide variety of different uses," he says. He goes on to explain his work with a computer: "To me, the computer is very open-ended, an incredibly powerful tool. I don't think I use a computer because it's faster, because when all is said and done, I don't know if it is. The computer transcends physics so well that it allows many considerations you'd have with analog media, such as wearing out a piece of expensive paper, to be blown out the window."

Niffenegger also works as an adviser in the KPT chats, teaches digital art at different institutions, and demonstrates HSC products at trade shows and conferences. "If I see someone struggling to get an answer in a chat, I find them and get them the answer behind the scenes. There are five to seven conversations going in the general chat at one time, hundreds going through IMs (Instant Messages)," he says.

Another often-heard voice in the KPT forum is Susan Kitchens, also known as KPT Susan. As a graphic artist and calligrapher, Kitchens "was rummaging around the Photoshop Forum one day and came across the Photoshop tips folder," she says. "'Who is this Kai guy?' I asked, 'and where does he or she get off naming a folder after himself?'" She soon learned the depth of knowledge available on the forum, and began to send email directly to Kai. Kitchens received what she later learned was the beta version of KPT. After seeing a few demos and meeting Kai in person she realized the power of the tools. "The thing that struck me first was the interface," she says. "It's cool. It's an invitation that says 'come up to this level of productivity.' I thought, 'I want to explore and see what I can do with this.'" Kitchens was asked to demonstrate KPT at the Fall '92 Comdex in Las Vegas, and soon after received an offer from HSC's President John Wilczak to become the KPT product manager and art director.

"What has continued to draw me is the online community," says Kitchens. "I found my perspective changing with the medium that allows me to connect to other people, to learn about human beings behind the screen names."

Julie Sigwart, technical services manager at HSC, also discovered Kai's early online forum while she was working as an illustrator and cartoonist for *The Arizona Republic*. After downloading beta versions of the KPT filters and incorporating them into her illustrations, she eventually met Kai at a conference and saw the full potential of the tools. Like Kitchens, Sigwart was asked to demonstrate KPT at Comdex and was later offered the position at HSC.

As technical services manager, Sigwart notices a pattern with KPT users. "In the first round, people might have questions about installation," she says. "In the next round, people ask, 'How did you do this or that effect?' This type of question-and-answer captures the spirit of the AOL forum, when Kai began uploading and sharing his special tips."

In addition to traditional phone support, HSC makes the most of the online forums. Plans are to expand from AOL to CompuServe and Internet. "My email list is hundreds," says Sigwart, describing her communication with customers, vendors, and other people in the industry. The online forums and chats are used to both gather and disseminate information. Beta versions of software or individual programs are also sent online, thus saving the cost and time of preparing physical packages. New product announcements are introduced online.

HSC works to maintain the special online folders. "We ask people to state their wishes and to offer their suggestions for the filters," says Sigwart. "We encourage people to upload their tips and tricks. And we encourage a lot of online networking so people can learn about other people who are doing similar work or who have the same interests," she says.

"It's about the cheapest computer school you can go to to get up to the minute information," Sigwart says. "Classes at universities are usually out of date. Online, you can talk to different companies and people. You can ask strange, obscure questions and be guaranteed that someone will have the answer."

The online KPT community goes beyond the use of the tools. It's a way of putting your arms around just what is happening with, and because of, the new media. "It ain't a table, and t-square, and ruling pen, and exacto knife industry anymore," quips KPT Susan. There's a lot to be explored, and good tools make the job easier. ■

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The Amiga Revolution

seaQuest DSV:

BY DOUGLAS J. NAKAKIHARA

A revolution instigated by Commodore Amiga and NewTek Video Toaster began with the TV movie *Babylon 5* last February, but has reached new heights with the weekly NBC series *seaQuest DSV*. State-of-the-art computer-generated images (CGI) are now being created effectively and quickly using consumer-based equipment, for a fraction of the cost of using traditional modeling or high-end graphics workstations. Truly professional tools are now in the hands of the masses.

Though the Video Toaster is mainly a video-editing device, it comes bundled with Lightwave, a 3-D rendering program that makes all of the CGI magic possible. The people at seaQuest, specifically Allen Hastings, the author of Lightwave, have a close relationship with New Tek. This often results in custom effects being written especially for the show, which eventually make their way into future public releases of Lightwave.

SEAQUEST DSV

SeaQuest DSV (Deep Submergence Vehicle) is a story about a 1000-foot submarine called seaQuest. It's set about twenty-five years in the future, at a time when the oceans have been colonized. Originally a ship of war, the sub has recently been refitted with scientific equipment and personnel, though it still maintains an arsenal of weapons. Used primarily for exploration, it often ends up a peace-keeper.

Jim Lima, the art director for *seaQuest*, heads up Amblin Imaging, whose offices are located in the back lot of Universal Studios in Southern California. Amblin Imaging is responsible for delivering *seaQuest*'s impressive CGI. Lima's credits are extensive and impressive—he has been the art director or conceptual designer for many popular feature films, commercials, theme park attractions, and even Michael Jackson's Dangerous tour. This is one talented guy!

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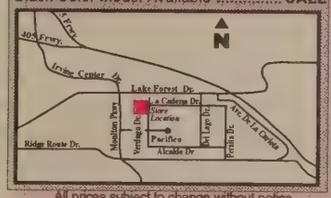

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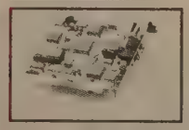

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Having helped put together the "bible" that sold the series to NBC, Lima feels lucky to be on the project at such an early stage in the game. As art director for the series, he designed the sets, props, vehicles, furniture, logo, colors, and materials—the "look" of the show is essentially his. This "one-man vision" gives the show a seamless quality.

As much as possible, Lima makes sure that everything in the show has a certain logic to it. Effects are not done for merely effects' sake. The main seaQuest bridge, for example, was designed to look like the walls were pushing back on the extreme pressure outside the sub. Even the logo was made "so your eyes go through it like a wave." "The word 'seaQuest should feel like water," he told me.

Basically an artist first and head of CGI second, Jim is trying to create an entirely new world—like George Lucas did in *Star Wars*—that the audience can be pulled into. Just as a painter wants his work to be more than an effective use of colors, Lima wants the CGI to be more than just great computer graphics. With the best CGI, the audience doesn't know it's computer generated.

"We average two minutes of new CGI a week—very little stock. In terms of audience gratification, it's way up there; that was always the goal when I designed the series. I want to give people what inspired me. When I look at films like *Close Encounters of the Third Kind, Raiders of the Lost Ark, ET,* or the *Star Wars* trilogy, those kinds of experiences are what people want. People are missing that," says Lima. "I feel really privileged to have been a teenager at the time to see that stuff and be inspired by it. I just think, 'What a way to pay back the kids today.' Instead of watching cop shows and amazing scary eyewitness video, you get to watch a show about imagination. Like I was inspired by Steven Spielberg and George Lucas, I hope there will be people out there that will be inspired by what I have given to the show."

Lima includes a lot of nearly subliminal effects that make the show's CGI extremely believable. If you watch the show, notice how murky the water looks. This murkiness also affects vehicle lights by giving them a finite range and making them glow faintly. "I wanted people to feel like they were holding their breath," Lima says. The underwater environment, he explains, is significantly more difficult than creating something in outer space, where everything can be rendered crystal-clear with perhaps one or two major light sources.

Although being underwater presents its own unique problems for CGI, it does have its benefits too. "As everyone knows, if you've spent any time near the ocean or near a huge body of water like the Great Lakes, it looks different all of the time. So we have the advantage, as you will see in subsequent episodes, of having water that is very ultramarine blue-black, going into greens, and going into sapphire blues, and some are a little bit purple. It is very subtle, and the audience will feel it more than anything.

"But instead of us being locked into a black field with little white dots there all of the time, we can create a different mood to that whole episode, purely based on the color and the lighting that we do our CGI in," says Lima. Furthermore, the seaQuest will also travel beneath icebergs, which "creates a whole other bizarre visual. It's really strange."

Lima explains, "One of the huge breakthroughs that we've done, which you'll

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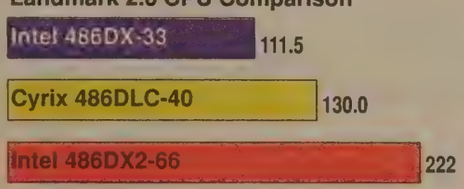

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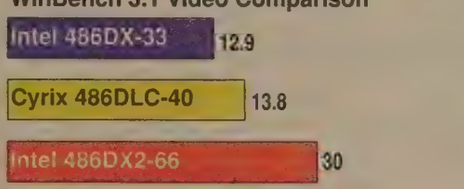

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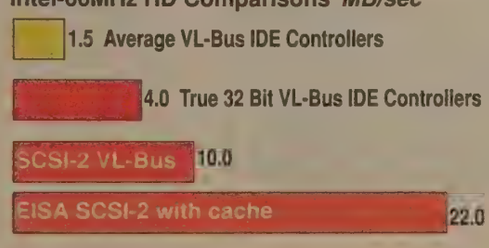

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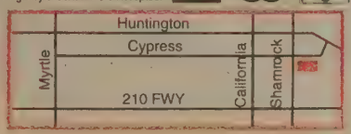

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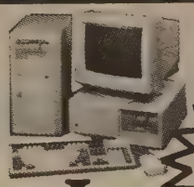

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see in subsequent episodes, is we're actually doing some shallow water shots, where you actually see the top of the water. It adds another complete dimension to the water that's just riveting."

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The main benefit of using the Amiga and Video Toaster is the cost savings, but it doesn't stop there. On an ongoing basis, money not spent on special effects can be allocated to other things.

Taylor Kurosaki, the digital systems coordinator, offers his thoughts on the advantages of their extremely cost-effective facility. "It allows writers the creative leeway to be able to write these big huge shows for TV. Finally, TV can be good again. With costs going up and up and up, if they were to do *seaQuest* on a higher-end system, you wouldn't have had Roy Scheider, you wouldn't have had the sets that you have, you wouldn't have had the big money. You would have had effects and that's it. It allows you to balance it out a little bit better. You've got good effects and now the whole show can be a big as the effects can be."

According to Lima, "Toaster is a wonderful machine; however, it is really still in its adolescence. That technology, where NewTek is taking it in a few years, is going to be the number-one competitor to Silicon Graphics."

"We are really utilizing every bit of the technology. We feel like the guys (the animators) are like magicians in a way, in that they figure out ways to get these machines that are so 'low-end' to do such 'high-end' stuff," adds Kurosaki. "We want to give people feature-quality effects-work faster, much faster than anyone else can. Have it look as good or better, and do it for a tenth of the cost."

Because Amblin Imaging relies on a non-mainstream computer platform, one would expect a little resistance from outside parties. "The Amiga has not hindered us in any way at all. The platform has no limitations that can inhibit us. Beyond that, it's just software, and the Amiga allows you to run the kind of software you need to run. I don't see this platform ever becoming obsolete, as long as it's going to be fast enough," says Kurosaki.

However, "there still are these kind of CGI snobs—if it's not done on an SGI then it's just a toy. This is going to shatter all of those misconceptions. Either they are going to have to change their ways—people like SGI and high-end effects houses are going to have to bring down their prices—or they are going to become as extinct as traditional effects."

CGI BENEFITS

CGI provides a much more flexible means of accomplishing special effects. Although CGI has been used extensively in films like *Jurassic Park*, the necessary Silicon Graphics workstations are just too costly to be used in a weekly television series. Shows like *Star Trek: The Next Generation* rely mainly on miniature models for special effects. Once filmed and animated, the shots become "stock footage" that can be used over and over. (A shot is basically one sequence of animation, usually not lasting more than a few seconds.) These canned shots can be simply composited over "the planet of the week" to cover the particular story, sort of like wearing different shirts with the same pair of pants to stretch your wardrobe budget. SeaQuest will use very little stock

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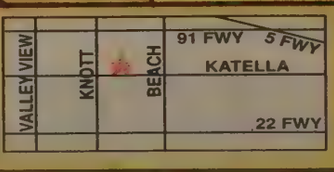

footage for the thirty or so shots in each episode, an amount unheard of for a weekly TV series.

The seven-man team of animators is constantly working on as many as three episodes. Additionally, nearly half of their time is spent on research and development of new effects and models. They have no formal lead time; it is more or less built into their production method. At the time I visited the facility, episode four hadn't been aired yet, and they were already working on episode ten.

THE FARM

Amblin Imaging's "rendering farm" consists of thirty-six coverless Amiga 2000s fitted with Video Toasters, '040 accelerators, and 32MB of RAM. (Taylor admits that even 32MB is not enough RAM.) Each Amiga in the farm simultaneously renders different frames. If you consider that a single frame can take one to three hours to render, the farm offers considerable benefits.

In total, there are over fifty Amigas, including some A4000s, at the facility. No resource is left untapped—Amigas normally used by animators during the day become rendering machines at night. An Ethernet-based Novell local area network links the Amigas together, using Oxxi's Amiga Client software. The network also includes PCs and Macs, used in various support roles. The farm has 12GB of storage space, which soon will be increased to 25GB. This is the biggest facility of its kind in the world.

Amblin Imaging is also the site of the first Screamer, NewTek's recently announced dedicated Lightwave rendering engine, reportedly capable of replacing forty '040-based Amigas. Lima expects the Screamer to go online in about a month, but wants to make sure it is 100% compatible before being integrated into actual production. With a price tag of under $10,000 (without RAM), the Screamer represents even more cost efficiency to the company.

THE RATINGS

Defying the critics, the debut episode was the number two show for the week, behind only *Monday Night Football*. After beating the Emmys and the movie *Hunt for Red October* in the second week, the NBC show has lost some steam, falling behind CBS's *Murder She Wrote* in the 8 pm Sunday time slot. Still, it has consistently beat ABC's *Lois and Clark: Adventures of Superman* every week.

seaQuest DSV has something for everyone—a strong lead character in Roy Scheider; Darwin the dolphin, as lovable and smart as Flipper ever was; kids can identify with the computer whiz kid on the ship. Jim Lima feels the show's success is attributable to the fact it is a quality family show.

THE FUTURE

Lima explains the impact of the Amiga and the Video Toaster in this way: "The future's starting here. It's not looking toward high-end systems, but looking towards low-end systems that will allow you to make the initial investment. It's the team here that's doing it. We've been allowed to prove ourselves—and we have, on very little money, very little initial investment—and be able to do a show where we're giving people *Star Wars* on a weekly basis, which is all our dreams." ■

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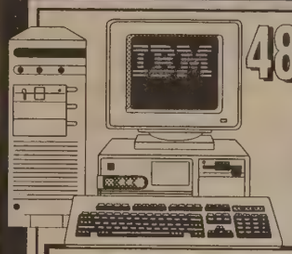

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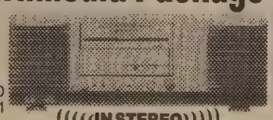

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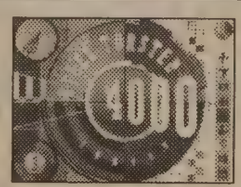

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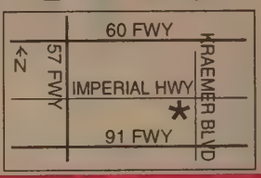

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Multi & Media beyon

Color Printers For Publishing And Multimedia

Plus: Mac Ergonomics

BY TONY REVEAUX

In both desktop publishing (DTP) and multimedia, complex professional communications work was able to migrate to the desktop level with the personal computer. DTP has matured in less than ten years—now even color pre-press documents are being configured before going to the printer.

The book on multimedia is still being written—and it may be a "to be continued" series at that, but there are many points at which DTP and multimedia share new technologies and products.

For some producers an important milestone is the arrival of lower-cost, compact versions of color dye sublimation printers, currently being offered by SuperMac, Kodak, Laser Master Corporation, Sharp, and DuPont Imaging Systems, among others.

Color printer prices have plummeted along with many other peripherals and devices like memory storage and scanners. Once encountered only in the service bureaus, color printers are now being included in corporate communications, advertising, design, publishing, and media production configurations—not so much for creating finished, deliverable products as for bringing in-house much more of the creative, conceptual, modeling, and proofing stages of production. Having a color printer in the office or studio can mean the instant display and turnaround of concepts instead of an overnight wait.

Tony Reveaux, a San Francisco-based consultant, is the editor of Computer Publicity News, *and writes the "MediaScan" column in* Film/TapeWorld. *He can be reached via Usenet (luna@well.sf.ca.us) or MCIMail 290-3008.*

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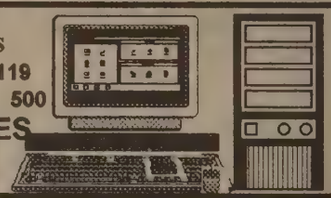

MultiMedia & beyond

Once encountered only in the service bureaus, color printers are now being included in corporate communications, advertising, design, publishing, and media production configurations.

Color laser printers, ink jet, thermal transfer, and dye sublimation (also known as dye diffusion, or "Dye Subs") produce color prints of varying quality. The highest quality is obtained with dye sublimation. It's the equivalent of "workstation level" color hard copy. It can produce prints of a photographic quality. (While a dye sublimation printer can deliver near-perfect comps and proofs for color pre-press work, it cannot be used as a match print. You still have to go to film for that.)

The print head heats a dye-impregnated ribbon, causing the dye to vaporize and diffuse as spots onto the coated paper. Dot intensity can be varied, creating smooth, continuous tone images without dithering. With the new stochastic screening halftoning, like that produced by Linotype-Hell's Diamond Screening (think fractals), even higher-quality, more photorealistic images can be produced on the desktop. It takes about three minutes to print one sheet, slightly longer for tabloid format. This kind of printer does not work on plain paper, so cannot serve as a multipurpose printer for the office.

For the multimedia producer dealing with effects, scenic design, advertising, and promotion, who needs to be able to quickly run concepts through several layers of client and management approval, the high cost of such output—from $3 to $5 per print—can be more than worth it. The cost is much lower than that of the same document produced at a service bureau. For this kind of producer, the "almost" quality of color prints from ink jet and other mid-range machines simply cannot pass muster with his demanding audiences.

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- 230 W Power Supply
- 32bit Local Bus 16.7M Color Graphic Accelerator w/1 MB (exp. - 2MB)
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- Enhanced 101 Key Keyboard
- Mouse & Mouse Pad

Local Bus

Reg. $1694

Cash $1609 *Complete*

486DX2-66

- INTEL 80486DX2-66 CPU w/256K Cache
- 8 MB RAM
- AMI BIOS, Math Co-Processor
- 8 Expansion Slots (Incl. 3 **VESA Local Bus Slots**)
- TEAC 1.2 MB Floppy
- TEAC 1.44 MB Floppy
- **345 MB** Hard Disk Drive
- **CD-ROM Drive (double speed)**
- **SoundBlaster Pro Sound Card**
- Local Bus Hard/Floppy Disk Controller
- 2 Serial/1 Parallel/1 Game Port
- Mid-Tower Case
- **250 W** Power Supply
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- Enhanced 101 Key Keyboard
- Mouse & Mouse Pad

Local Bus

CD & Sound

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486DX2-66

- INTEL 80486DX2-66 CPU w/256K Cache
- 8 MB RAM
- AMI BIOS, Math Co-Processor
- 8 Expansion Slots (Incl. 3 **VESA Local Bus Slots**)
- TEAC 1.2 MB Floppy
- TEAC 1.44 MB Floppy
- **345 MB** Hard Disk Drive
- **CD-ROM Drive**
- **SoundBlaster** Pro 16bit Sound Card
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- Local Bus Hard/Floppy Disk Controller
- 2 Serial/1 Parallel/1 Game Port
- Mid-Tower Case
- 250 W Power Supply
- 32bit Local Bus 16.7M Color Graphic Accelerator w/1 MB (exp. - 2MB)
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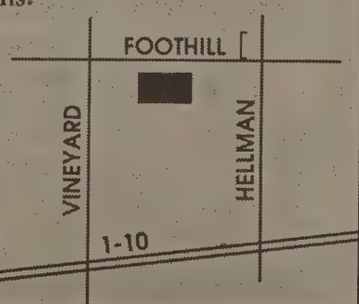


page and tabloid size. The full-page model is under $10,000, and takes up very little more room on the desktop than a Personal LaserWriter. The instructions are clear, and it is easy to use—from the time it left the box, I was able to get it up and running in less than an hour. That included setting up the SCSI with the SuperMatch Interface Box (which includes external termination), and loading the big CYMK ribbon and the operational software. Included in the package are plug-ins for Adobe Photoshop, EFI Cachet, Fractal Design Painter, and Fractal Color Studio.

Bundled with the package is the latest EfiColor matching system software. From the RasterOps 24XLTV video capture board, very good quality video frame prints can be pulled through the ProofPositive printer. The Apple Color OneScanner with Ofoto 2.0 can complete the desktop color loop configuration.

You must have a Centris 650 or a Quadra to support the ProofPositive Printer. To run more than one application at a time, or to print from QuarkXpress, you really need at least 16MB of RAM in your Mac. With a minimum of 8MB, you can pull prints through Adobe Photoshop's memory-dodging Export channel, thanks to its thoughtful and efficient software design.

APPLE ADJUSTABLE KEYBOARD

When you think of the "computer user interface," usually what comes to mind is the front end of the operating system desktop controls that you see on your monitor screen. But it's really the keyboard that's the most direct and intimate interface between you and your computer.

As important as that point of contact is, keyboards are treated mostly as commodity peripherals, with little difference between them in basic concepts.

Spurred on by the advance of ergonomic design in the workplace in response to carpal tunnel syndrome and other repetitive stress injuries, there has been a slow but long-overdue rethinking of peripheral design. Apple's Adjustable Keyboard, introduced a few months ago, is one of the better answers to this need.

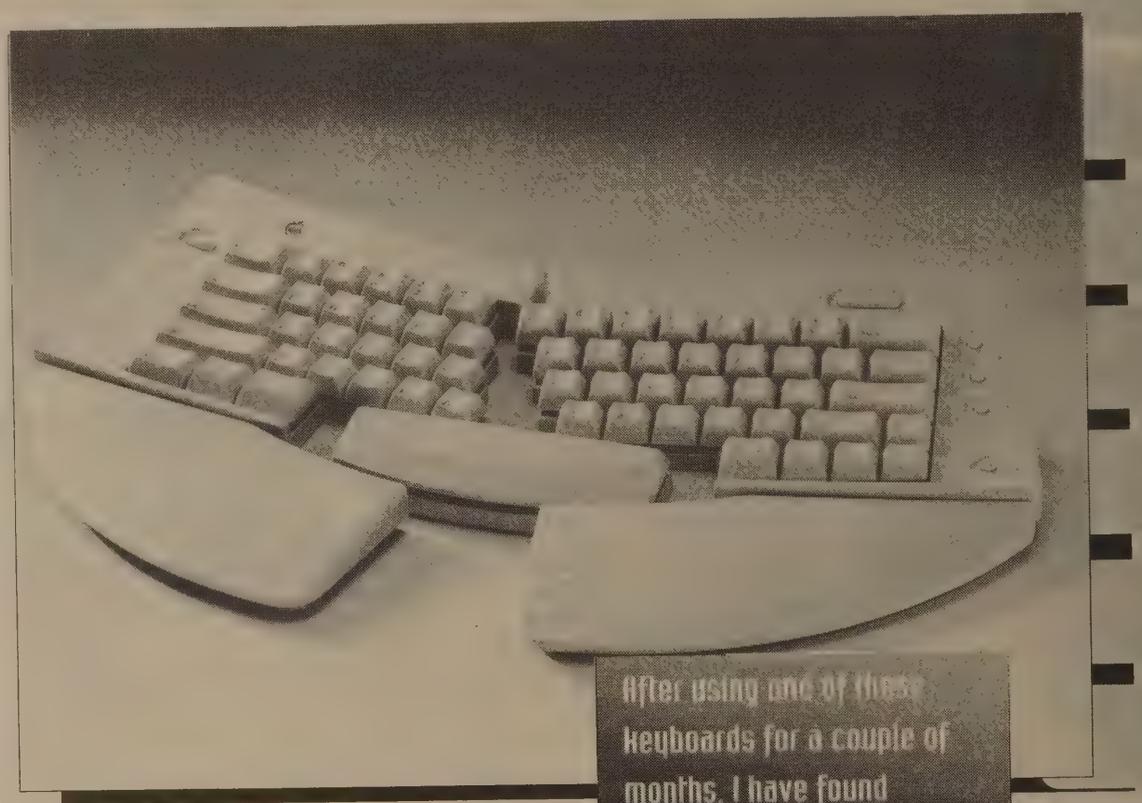
If you've already seen one, with its "split" down the middle, you may have responded positively to its Star Trek look, or merely interpreted it as a post-modern cubist style statement. But it's actually the ruler-straight conventional keyboard that is abstracting nature, not the Apple Adjustable version. The next time you're in front of your straight keyboard, close your eyes and extend your forearms until your hands are over the keys. Open your eyes, and watch while you rotate your palms about thirty degrees in order to match your fingers to the rows of keys. If you relax them, your hands will rotate back to their original positions. This means that along with everything else that you do in order to type, you must keep up that tension in your wrists, hour after hour, without relaxing.

HANDS-ON APPROACH

Approaching the Adjustable Keyboard, it may not be a bad idea to close your eyes too—because its looks may have put you off in the first place. But when you lower your fingers to the keys, your wrists can remain in their natural positions. The keys can be oriented at just the right angle—adjustable up to thirty degrees.

After using one of these keyboards for a couple of months, I have found noticeably reduced finger-fatigue and typing tedium. I can also touch-type faster.

The Apple Adjustable Keyboard has a space bar that's hard to miss. It is wide and deep and extends in a crescent below. There are two cheek-like plastic palm rests that clip to the bottom of the keyboard. They fall off if you lift the keyboard from the desk. I leave them off and use a Silicon Sports Puzzle Pad wrist rest bar instead to good advantage.



After using one of these keyboards for a couple of months, I have found noticeably reduced finger-fatigue and typing tedium.

There are sound recording and playback control buttons on the right hand side ready for multimedia productivity applications. But where are the power user's function keys? A separate extended keypad module can be connected to the right or the left side of the unit. In the extended keypad's layout, the cursor key cluster and the numeric keypad aren't too far away. The six document editing keys are above the cursors. To the left of them are the three columns of fifteen function keys (an odd configuration).

Apple includes a detachable clear plastic template cover that clips on over the F-

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COMTRADE	**17,493**
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Gateway 2000	16,400
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Sources: 486/66DX2 Review
PC Magazine January 26, 1993

The Competition!

A Benchmark is worth a thousand words. At least that is our philosophy at Comtrade. No Multi-Million Dollar Ad Budgets, No Fancy PR Firms. Just performance, Quality, Value and Service. Like David vs Goliath, we have been quietly building the best, most powerful systems that defeat the large, slow moving, mass producing Goliaths by garnishing the top scores in virtually every performance category, from virtually every industry publication. But don't take our word for it. Analyze the benchmarks, Analyze the reviews. And then let Comtrade custom build a rock solid, lightninig fast system for you. With so many top honers, we promise to leave you with a lasting impression. (Just ask Goliath!)

> The Comtrade 486 achieved the best processor performance of all profiled systems.
> - PC Sources, February 1993.

Comtrade's Thunderous VL-Bus Video

Comtrade Diamond Viper	60
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ATI Ultra Pro	14
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First-Place Graphics. Comtrade outdistanced the rest of our test group - Windows Sources, June 1993.

WinMark 3.11 (Million pixels per second); Diamond Viper with new driver.

intel inside

Pentium Ready

Comtrade was the first company to introduce Local Bus in the direct channel in January, 1992, and we want to be the first and last PC you think of for Local Bus. Our VESA standard Local Bus Systems not only finish first in performance, but also assure first-rate compatibility and expandability (while many other companies, such as Compaq, Dell, & DEC still sell Proprietary Local Bus system without any VL-Bus slot.) And perhaps most important, our VLB systems are Total VLB Solution - not only VL-Bus Video, but VL-Bus Hard Disk also - overall the fastest VESA Local Bus Solution on the market. If you work in Windows, Comtrade's VLB Systems will be love at first sight.

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> Comtrade processor outpaced all the other - Windows Sources, June 1993.

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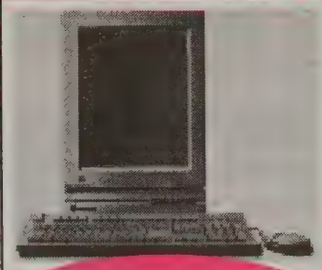

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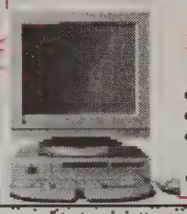

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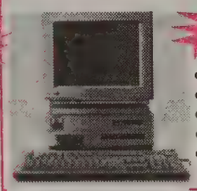

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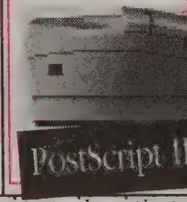

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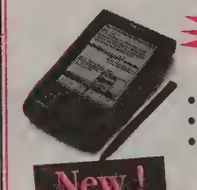

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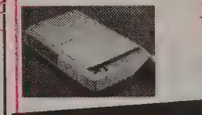

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keys. The idea is that you can write your own codes for the functions of your choice, as in CE Software's QuicKeys, or that third-party software developers might imprint template accessories with proprietary commands keyed to their programs, like Excel or WordPerfect.

A better approach than writing on the template itself is to unclip the template and lay strips of self-adhesive paper correction tape on the unit under the rows of F-keys. Write the codes or symbols where you want them and then replace the template. They won't wear off and are easy to change.

But the real rub here is that the F-keys are so far away from the alphanumeric keyboard that you have to lift your hand from the keys and reach over—to as much as a foot away—to press them. In most extended keyboards, the function keys are on the main keyboard itself in a top row above the number keys, just a flick of the finger away. This "island" extended keypad is a counterproductive gesture, in that it eats up time instead of saving it. Now, why couldn't they have designed the Apple Adjustable Keyboard with the F-keys above? The keys are small and compact, so they could fit with another inch or two of deck on the board.

NOW IT CAN BE TOLD...

Well, they did.

According to someone who was on the development team for this product, they even completed another prototype version that not only neatly incorporated the F-keys, but also included a PowerBook-type of trackball. It got sidetracked and shelved during one of the reorganizations. Here's just another example of how, in any big, productive company, there are a lot of good ideas that don't get out the door as well as all those flawed concepts that rightfully end up flaming in the trash can. This could have been *the* Mac keyboard of the '90s!

ERGONOMIC MOUSE

The new Apple Ergonomic Mouse, following the lead of some other developers such as Logitech with the MouseMan, also lets nature take its course. When you extend your arm to rest your hand on a table, the hand is cupped. The original Apple mouse was as flat as roadkill, so you had to spread your palm to match its surface. The new Ergonomic Mouse is a natural fit with the shape of your hand.

Note: If you are using a third-party mouse, or perhaps an older Apple mouse, with a 64040 Mac, and you encounter a strange phenomenon (rarely encountered) where the cursor only moves down on a diagonal after bootup —relax. There's nothing wrong with your computer. Try the new Ergonomic Mouse that came with the machine and the glitch will be history.

The Apple Adjustable Keyboard and the Apple Ergonomic Mouse are part of the continuing user-friendly human interface that's being extended even further with the new Mac AV series of computers—so user-friendly that they listen and talk back to you. ■

Opcode and West L.A. Music would like to introduce you to MIDI.

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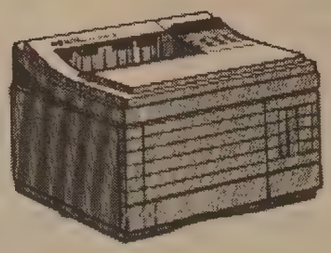

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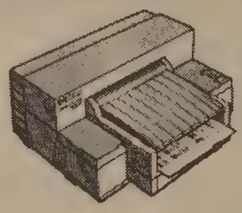

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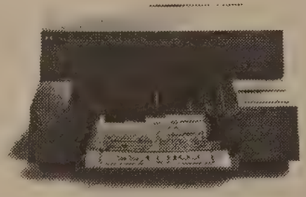

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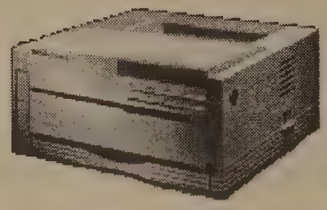

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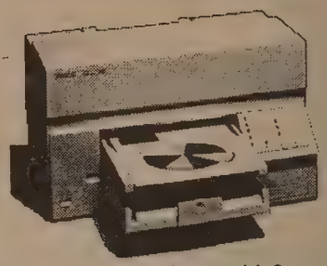

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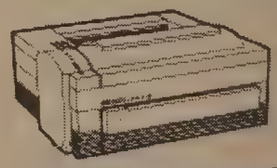

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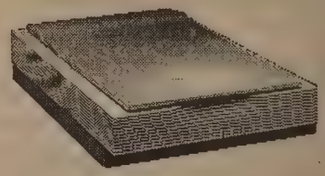

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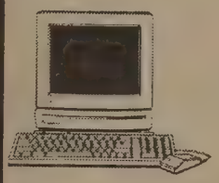

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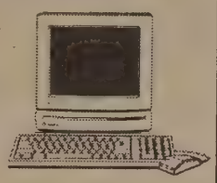

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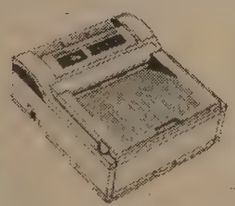

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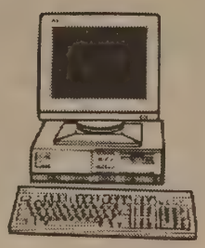

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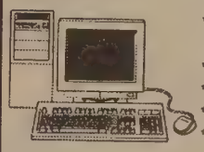

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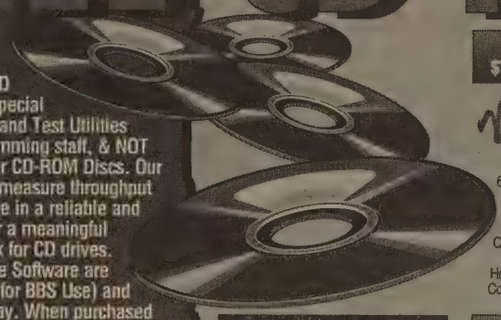

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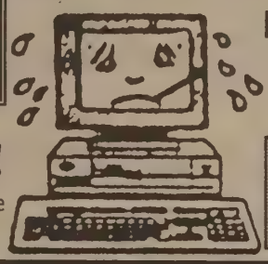

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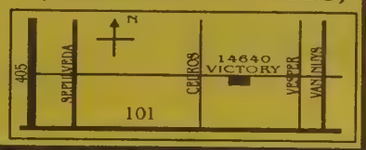

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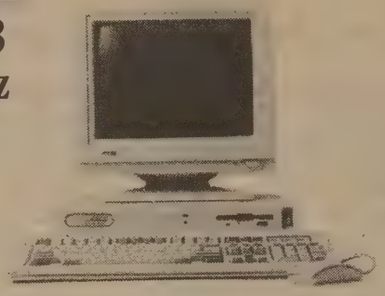

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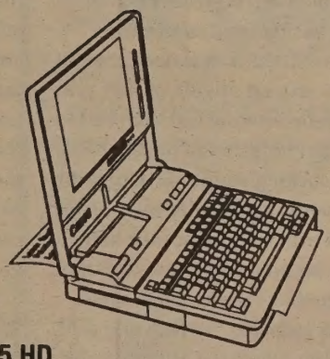

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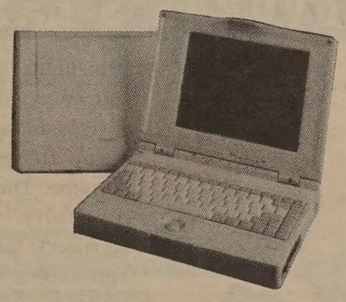

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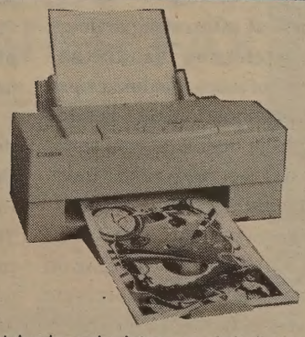

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A Time Capsule From 2032

Or *How The Rich Get Richer*

BY JOHN C. DVORAK

DVORAK'S LAST COLUMN

Last week I received my annual time capsule from the future. This one, from the year 2032, was sent through that space-time warp hole that's in a shower in the Cambridge Marriott and consisted of press clippings. Very few were interesting except the stock market prices. I'd tell you some of the numbers on the sheet but, since the stock splits and reverse splits are unknown, the figures are probably useless, right?

There was an interesting article about the airlines banning the new holographic laptop computers on takeoffs and landings, and a slew of complaints from experts saying that the FCC should actually test these devices. Apparently most of the airlines have already banned people with large heads, because it's thought that large-headed people have psychic energy that can confuse an airliner's navigational equipment. This was highlighted by an article in the *New National Enquirer*. The airlines all say, "Better safe than sorry." One airliner, whose owner apparently has a big head, bucks the trend and caters to the big-headed people. Curiously, this group includes most of the owners of major air carriers, and many fly on the new airline, Air Fathead.

Among all sorts of interesting articles, none was more interesting than the one about the giant tank of saliva that broke open at the Microsoft headquarters and flooded most of the campus in Redmond with spit—Bill Gates' spit, to be exact. Well, almost exact. Therein lies the interesting story.

For some unknown reason Bill Gates began to collect his own spit beginning on January 1, 2000, as some sort of corporate promotion. He was planning to give every employee a vial of saliva as a year-end bonus. Being one of those people who believes that the end of the year 2000 actually marks the end of the millennium, he figured January 1, 2001 was the day to celebrate. It also turned out to be easier to get a hall for a big party a year late (no coincidence). Anyway, he began to collect saliva a year earlier in anticipation of the big celebration.

What happened after that decision was incredible.

First people started to steal jars of Bill's spit for sale to hoodoo men, witches, and venture capitalists (to heal cuts, they say). It became an epidemic by mid-year. Almost half of the 50,000 gallons of spit were missing by July. It was blamed on evaporation until Gates himself spotted a jar of his own spit on a banker's desk. Instead of getting mad, Gates saw it as a marketing opportunity. If people were stealing the stuff, then it should be worth something.

Meetings were held, strategy sessions at the lodge were never-ending. It was decided that the spit would not be given to employees, but would be marketed as an elixir.

Gates was outfitted with a dentist's spit sucking device around August of that year (2000) and anyone meeting with him had to listen to him mumble as the device made this irritating sucking sound. In sympathy many employees, especially new hires, walked around with a symbolic tube in their mouth, which became some sort of corporate badge of honor by the end of the year.

The spit was collected, bottled, and sold. But it was faddish. While the Microsoft spit-based products made the company $4 million, the market dried up overnight when it was discovered that the spit was actually a mixture of saliva from hundreds (perhaps thousands) of Microsoft programmers, who thought they were helping the cause by tapping a vacuum line into the line running from Gates' office to the large tank out back.

A DNA specialist had determined that the spit was maybe only 1% from Gates and the rest was from some other people. An investigative reporter from the *Seattle Times* found the links directly from the programmers' offices into the tank. A book was written called *Undocumented Microsoft Spit Acquisition*. The FTC began an investigation and turned it over to the Saliva Board instead.

A big scandal ensued. Common Cause mounted a class action suit against the Spit Division of Microsoft. Gates himself was annoyed. He had a 250,000-gallon tank of spit that he thought he was filling up with his own saliva. He apparently liked to brag about his ability to out-produce anyone in the company. He found many of the culprits and was going to fire them. Luckily, like most Microsoft employees, they got on their hands and knees and begged forgiveness, which he kindly granted (with a pay cut).

Gates still figured that someday the market would revive once the scandal passed by. He figured that he could document his own spit output with special equipment (developed by the FBI for reasons unknown). He'd get the State of Washington to start a Spit Board to audit the stuff. Convinced that anything coming from him was a sure winner, he tried to market his fingernails and hair clippings as well as other excreta too horrible to mention. The employees, in fact, were so sick of getting pieces of Bill (usually floating inside a solid lexan cube) for Christmas bonuses that they unionized in 2028. The then-famous toenail clippings given out in 2026 nearly caused an employee revolt as they surrounded the Redmond campus with torches and threatened to burn down the place.

Gates blamed the whole thing on Steve Ballmer and fired him in a public ceremony. The *Seattle Times* noted that Ballmer had quit the company five years earlier to open a hairdressing salon called Mr. Steve's in Las Vegas. He could not be reached for comment, but a spokesperson for Mr. Steve's said that Gates made a recent habit of firing Ballmer whenever there was a screw-up at the company.

So one day the huge tank ripped open, spewing 30-year-old spit all over the place. A huge pond of the yucky stuff froze over that winter and Microsoft sponsored a speed-skating event where two world records were broken. Apparently the spit was very slippery and a few offers were made to make speed skating rinks using what Gates saliva could be salvaged from the pond.

It was later discovered that the guar gum found in a McDonald's milk shake could do the same thing. Actually, the guar gum turned out to be better, but Microsoft had a better reputation for slipperiness, and most of the contracts went to Microsoft, which also bundled Excel v86 with each gallon of "rink accelerator." Gates made $50 million from the stuff.

Yes, 2032 was an interesting year. ■

© 1993 by John C. Dvorak. All rights reserved. *John C. Dvorak graduated from the University of California. He is a contributing editor of* PC Magazine *and* MacUser, *and is considered by many to epitomize the contrarian view of things—a charge that he vehemently denies. Dvorak's motto is: If you have nothing nice to say, then don't say anything at all.*

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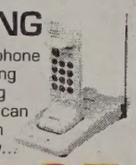

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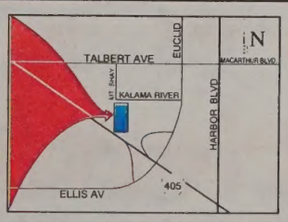

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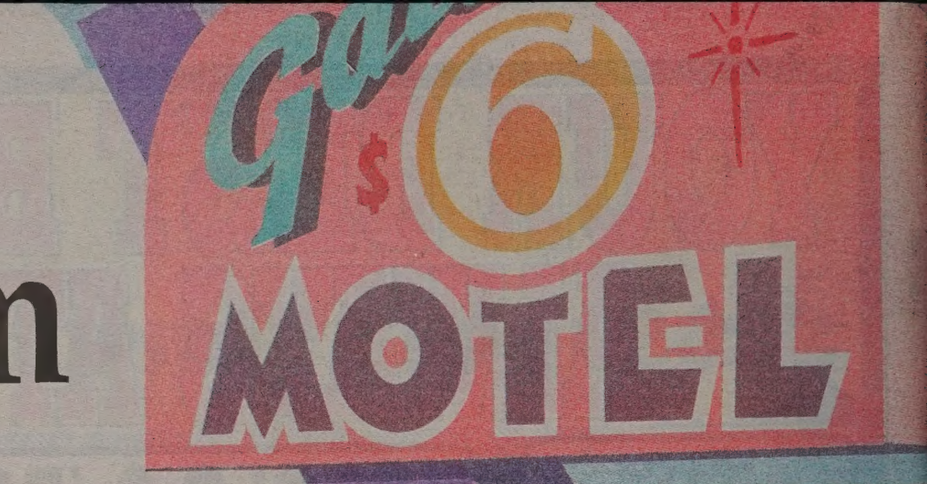

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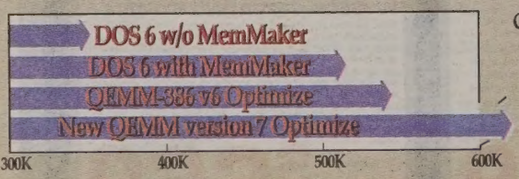

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WORLD PRODUCT OF THE YEAR 1992

How we got the chart numbers: CPU—486/33 ALR Power/business VESA machine equipped with 16 megs of RAM and running MS-DOS 6. Comparisons were done using the following memory managers: QEMM 7, QEMM 6.02, MS-DOS 6 MemMaker. In addition to the driver (or drivers) required by each memory manager, the following drivers, DOS resources and programs were loaded for all comparisons: in the CONFIG.SYS file: SETVER.EXE, DOS=HIGH, FILES=20, BUFFERS=10, STACKS=0,0, MVSOUND.SYS, SNDBK12.SYS, SLCD.SYS, DOS SHELL=statement, in the AUTOEXEC.BAT file: VSAFE, MSCDEX, UNDELETE, LSL.COM, NE2000.COM, IPXODI.COM, NETX OR EMSNETX, MOUSE.COM, SMARTDRV.COM, PRTSCCAP.COM.

Quarterdeck

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